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PREFACE

A complete list of Vehicle Diagram Books is shown below, together with new or revised book reference numbers & the colours of the respective book covers. The existing Diagram books covering Locomotives and Rail Crane vehicles which were previously shown with MT/reference numbers, have now received new covers in accordance with this revised numbering system.

REVISED VEHICLE DIAGRAM BOOK NUMBERS

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<th>Vehicle Type</th>
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JULY 1982

Issued by:--
Director of Mechanical & Electrical Engineering
Railway Technical Centre
DERBY

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### Revision Record

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VEHICLE DIAGRAM BOOK NO 210

FOR

Electric Multiple Units

(Including A.P.T.)
SUMMARY OF CONTENTS

NOTE: - The contents of this book are arranged in alphabetical order, according to vehicle DESIGN CODE

EA Driving Motor Second
EB Driving Motor Brake Second
EC Motor Second
ED Motor Brake Second
EE Driving Trailer Second
EE Driving Trailer Composite
EF Battery Driving Trailer Second
EF Battery Driving Trailer Composite
EG Driving Trailer Brake Second
EH Trailer First
EH Trailer Second
EH Trailer Composite
EI Battery Driving Motor Second
EJ Trailer Brake First
EJ Trailer Brake Second
EJ Trailer Brake Composite
EM Trailer Griddle - Unclassed
EN Trailer Buffet Second
EN Trailer Buffet - Unclassed
EO Battery Driving Trailer Brake Second
EX Driving Motor Luggage Van
EY Motor Luggage Van

LC Motor-APT
LE Driving Trailer Second-APT
LH Trailer First-APT
LH Trailer Second-APT
LH Trailer Unclassed-APT
LJ Trailer Brake First-APT
LK Trailer Restaurant Second with Buffet-APT
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TRACTION DATA FOR MULTIPLE UNITS

EMU: GARSTON-LIVERPOOL-SOUTHPORT, INTRODUCED 1979

| VOLTAGE   | 600/750 VOLTS D.C. THIRD RAIL |
| TRACTION MOTORS | 4 X 110 HP GEC |

| BASIC TYPE | EA-201-0A |

| VARIANTS | NONE |
BRAKES
Bogie/Suspension
Body-construction
Couplings
Train-Heating
Max speed n.p.h.
Hmbrad, curve chains
Lighting
Tare weight tonnes
Gangways
A.A.S.
Train-communication
Buffers

BASIC TYPE

Electro pneumatic
6x1/Pb & 6x1/Pb one of each
Steel underframe & body framing-aluminium body & roof
Automatic tight lock outer end-bar inner end
Waste heat recovery-ducted warm air
75
3.5
Fluorescent & tungsten
36
Flexible diaphragm/rigid (grp) inner end only
Fitted
Driver/signal box, driver/guard, public address
Not fitted

ALTERNATIVES

Steel underframe, body framing & body-aluminium roof

TRACTION DATA FOR MULTIPLE UNITS

EMU- Great northern inner suburban. Introduced 1976

VOLTAGE 25 kv a.c. overhead & 750 volts d.c. third rail
TRACTION MOTORS 4 x 110 HP GEC G310AZ

BASIC TYPE

EA 204 0A

VARIANTS

08. Steel underframe, body framing & body-aluminium roof.
EA 206

BRAKES
BOGIE/SUSPENSION
BODY-CONSTRUCTION
COUPLINGS
TRAIN-HEATING
MAX. SPEED K.P.H.
WIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANSWAYS A.V.S.
TRAIN-COMMUNICATION
BUFFERS
EMERGENCY EQUIPMENT

BASIC TYPE
EA 206 0A

ALTERNATIVES
ELECTRO-RHEUMATIC
B1x/P0. & B1x/Pd (ONE OF EACH)
STEEL UNDERFRAME & BODY-FRAMING-ALUMINIUM BODY & ROOF
AUTOMATIC TIGHTLOCK OUTER END-BAR INNER END
ELECTRIC-DUCTED VARM AIR
70
3.5
FLUORESCENT & TUNGSTEN
54.5
FLEXIBLE DIAPHRAGM/RIGID (GRP) INNER END ONLY
FITTED
DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER
NOT FITTED
EMERGENCY COUPLER

TRACTION DATA FOR MULTIPLE UNITS
EMU- GLASGOW AREA- INTRODUCED 1979.

VOLTAGE 25 KV A.C. OVERHEAD
TRACTION MOTORS 4 x 110 HP GE C310AZ OR 4 x 110 HP BRUSH TM61-53 - INTERCHANGEABLE
DRIVING MOTOR STANDARD

CLASS 315

DMS

EA 207

VEHICLE NOS. 64461-64542 ORIGINALLY FITTED WITH BRUSH ELECTRICAL EQUIPMENT

VEHICLE NOS. 64543-64582 ORIGINALLY FITTED WITH GEC ELECTRICAL EQUIPMENT

* THESE BAYS SMOKING ON SOME VEHICLES

SEE VARIANTS

SEATS 74
TOILETS -
COMPARTMENTS -
GUARDS COMPARTMENTS -
VENTILATION -
CATERING EQUIPMENT -

ORIGINAL DIAGRAMS FOR REFERENCE:
BR 488 & BR 489

ISSUE 5
DATE APR 88

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**BASIC TYPE**

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**ALTERNATIVES**

**TRACTION DATA FOR MULTIPLE UNITS**

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<td>4 X 110 HP GEC G310AZ OR 4 X 110 HP BRUSH TM61-53 -INTERCHANGEABLE</td>
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**VARIANTS**

- EMERGENCY TOOLBOX FITTED, 38% NON SMOKING.
**BRAKES**

**Bogie/Suspension**

**Body Construction**

**Couplings**

**Train Heating**

**Max. Speed M.P.H.**

**Min. Rad. Curve Chains**

**Lighting**

**Tare Weight Tonnes**

**Cangways**

**A.V.S.**

**Train Communication**

**Buffers**

---

**BASIC TYPE**

**ALTERNATIVES**

**Electro Pneumatic**

**BX1/Ph & BX1/Pr (One of Each)**

**Steel Underframe & Body Framing—Aluminium Body & Roof**

**Automatic Tightlock Outer End-Bar Inner End**

**Electric-Ducted Varm Air**

75

3.5

**Fluorescent & Tungsten**

36

**Flexible Diaphragm/Rigid (GRP) Inner End**

**Fitted**

**Driver/Guard—Public Address with Transmitter**

**Not Fitted**

---

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU—**

**Introduced 1980.**

**Voltage**

750/850 Volts D.C. Third Rail

**Traction Motors**

4 x 110 HP GEC G310AZ OR 4 x 110 HP Brush TM61-53—Interchangeable

---

**BASIC TYPE**

**EA 208 DA**

---

**VARIANTS**

**NONE**


**BRAKES**

**BOGIE/SUSPENSION**

**BODY CONSTRUCTION**

**COUPLINGS**

**TRAIN HEATING**

**MAX.SPEED M.P.H.**

**MIN.RAD.CURVE CHAINS**

**LIGHTING**

**TARE WEIGHT TONNES**

**GANGWAYS**

**A.W.S.**

**TRAIN COMMUNICATION**

**BUFFERS**

**S.R.DESIGN REFERENCE CODE**

---

**BASIC TYPE**

- **ELECTRO PNEUMATIC**
  - S.R.MK 4 POWERED & COMMONWEALTH UNPOWERED (ONE OF EACH)
  - STEEL
  - AUTOMATIC DROPHEAD (BUCKEYE) OUTER END - AUTOMATIC SOLID SHANK (ALLIANCE NO.2) INNER END
  - ELECTRIC (BR)
  - 90
  - 3.5
  - FLUORESCENT & TUNGSTEN
  - 41.5
  - EXPRESS ELECTRIC
  - Fitted
  - DRIVER/GUARD-PUBLIC ADDRESS
  - RETRACTABLE SPINDLE - 559 X 356 OVAL OUTER END ONLY
  - AK

**ALTERNATIVES**

---

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU-**

INTRODUCED AS CLASS 411/2 1958 - REFURBISHED AS PROTOTYPE & RECLASSED 1975

**VOLTAGE**

750/850 VOLTS D.C. THIRD RAIL

**TRACTION MOTORS**

2 X 250 HP ENGLISH ELECTRIC

---

**BASIC TYPE**

EA 261 1A

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**VARIANTS**

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<td>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-AUTOMATIC SOLID SHANK</td>
<td>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-AUTOMATIC SOLID SHANK</td>
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<tr>
<td>ELECTRIC (BR) 90</td>
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<td>3.5</td>
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<tr>
<td>FLUORESCENT &amp; TUNGSTEN 41.5</td>
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<tr>
<td>EXPRESS ELECTRIC Fitted</td>
<td>DRIVER/GUARD</td>
</tr>
<tr>
<td>RETRACTABLE SPINDLE-559 X 356 OVAL-OUTER END ONLY</td>
<td></td>
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<tr>
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</table>

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU**

- **INTRODUCED AS CLASS 411/2 1958-REFURBISHED AS PROTOTYPE & RECLASSED 1975**

**VOLTAGE** 750/850 VOLTS D.C. THIRD RAIL

**TRACTION MOTORS** 2 x 250 HP ENGLISH ELECTRIC

**BASIC TYPE**

EA 262 1A

**VARIANTS**

NONE
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRO PNEUMATIC</td>
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<tr>
<td>S.R.MK 4 POWERED &amp; COMMONWEALTH UNPOWERED(ONE OF EACH)</td>
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<td>STEEL</td>
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<tr>
<td>AUTOMATIC DROPHEAD(BUCKEYE)OUTER END-AUTOMATIC SOLID SHANK</td>
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</tr>
<tr>
<td>(ALLIANCE NO.2)INNER END</td>
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<tr>
<td>ELECTRIC(BR)</td>
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<tr>
<td>90</td>
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<tr>
<td>FLUORESCENT &amp; TUNGSTEN</td>
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<td>EXPRESS ELECTRIC</td>
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<tr>
<td>DRIVER/GUARD-PUBLIC ADDRESS</td>
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</tr>
<tr>
<td>RETRACTABLE SPINDLE(359 X 356 OVAL)OUTER END ONLY</td>
<td></td>
</tr>
<tr>
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</table>

**TRACTION DATA FOR MULTIPLE UNITS**

| VOLTAGE                                       | 750/850 VOLTS D.C.THIRD RAIL                    |
| TRACTION MOTORS                               | 2 X 250 HP ENGLISH ELECTRIC                     |

**BASIC TYPE**

EA 263 OA-REFURBISHED

**VARIANTS**

NONE
BRAKES
Bogie/Suspension

BODY CONSTRUCTION
Couplings

TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
A.W.S.
TRAIN COMMUNICATION
BUFFERS
S.R. DESIGN REFERENCE CODE

BASIC TYPE
ELECTRO PNEUMATIC
S.R. MK 4 POWERED & COMMONWEALTH UNPOWERED (ONE OF EACH)

STEEL
AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-AUTOMATIC SOLID SHANK
(ALLIANCE NO. 2) INNER END
ELECTRIC (BR)
90
3.5
FLUORESCENT & TUNGSTEN
41
EXPRESS ELECTRIC
FITTED
DRIVER/GUARD-PUBLIC ADDRESS
RETRACTABLE SPINDLE-559 X 356 OVAL-OUTER END ONLY
AK

ALTERNATIVES
S.R. MK 3B POWERED & COMMONWEALTH UNPOWERED (ONE OF EACH)

AL, AM, AN, AN 1A, AM 1A

TRACTION DATA FOR MULTIPLE UNITS
EMU-

VOLTAGE
750/850 Volts D.C. THIRD RAIL

TRACTION MOTORS
2 X 250 HP ENGLISH ELECTRIC

BASIC TYPE
EA 264 OA-REFURBISHED

VARIANTS
1A REFURBISHED-S.R. DESIGN REFERENCE CODE AM,
3A REFURBISHED-S.R. DESIGN REFERENCE CODE AL,
5A REFURBISHED-S.R. DESIGN REFERENCE CODE AN 1A.
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<td>BOGIE/SUSPENSION</td>
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<tr>
<td>BODY CONSTRUCTION</td>
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<td>TRAIN HEATING</td>
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<tr>
<td>MAX. SPEED M.P.H.</td>
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<td>M.N.RAD. CURVE CHAINS</td>
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<tr>
<td>LIGHTING</td>
<td></td>
</tr>
<tr>
<td>TARE WEIGHT TONNES</td>
<td></td>
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<td>GANtrys</td>
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<td>A.V.S.</td>
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<tr>
<td>TRAIN COMMUNICATION</td>
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<tr>
<td>BUFFERS</td>
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<tr>
<td>CLASS 501 MOTOR</td>
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<tr>
<td>STEEL</td>
<td></td>
</tr>
<tr>
<td>SCREW</td>
<td></td>
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<tr>
<td>ELECTRIC (BR)</td>
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<tr>
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<td>NOT FITTED</td>
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<tr>
<td>SPINDLE-559 X 356 OVAL</td>
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</table>

**Traction Data for Multiple Units**

EMU-LONDON DISTRICT. INTRODUCED 1957.

- VOLTAGE 630 VOLTS D.C. THIRD RAIL
- TRACTION MOTORS 4 X 185 HP GEC

**Basic Type**

EB 201 0A

**Variants**

NONE
## EB 202

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
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<tbody>
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<td>BRAKES</td>
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<tr>
<td>BOGIE/SUSPENSION</td>
<td>CLASS 502 MOTOR</td>
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<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
</tr>
<tr>
<td>COUPLINGS</td>
<td>SCREW (OUTER END LOOSE COUPLED, INNER END CLOSE COUPLED)</td>
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<td>ELECTRIC (38)</td>
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<td>LIGHTING</td>
<td>TUNGSTEN</td>
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<tr>
<td>TARE WEIGHT TONNES</td>
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<tr>
<td>GANGLAYS</td>
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<td>A.V.S.</td>
<td>NOT FITTED</td>
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<tr>
<td>TRAIN COMMUNICATION</td>
<td>DRIVER-GUARD</td>
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<tr>
<td>BUFFERS</td>
<td>SELF CONTAINED 457 DIA.</td>
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</table>

### Traction Data for Multiple Units

EMU - LIVERPOOL-SOUTHPORT. INTRODUCED 1939.

**Voltage**: 630 Volts D.C. Third Rail

**Traction Motors**: 4 x 235 HP English Electric

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>EB 202 0A</th>
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</thead>
</table>

### Variants

NONE
DRIVING MOTOR BRAKE SECOND

CLASS 503

DMBS

EB 203

41'-0" Bogie Centres
57'-11 1/4" Over Headstocks
60'-7 1/6" Overall

58'-0" Over Body

SEATS
TOILETS
COMPARTMENTS
GUARDS COMPARTMENTS
VENTILATION
CATERING EQUIPMENT

56
-
-
1
-
-

ORIGINAL DIAGRAMS FOR REFERENCE:
LMS 344A

ISSUE 1
DATE SEP 80

VISIT http://www.barrowmoremrg.co.uk
BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
A.V.S.
TRAIN COMMUNICATION
BUFFERS

BASIC TYPE

ALTERNATIVES

ELECTRO PNEUMATIC
CLASS 503 MOTOR
STEEL
AUTOMATIC SOILD SHANK (ALLIANCE NO.2)
OUTER END-PERMANENT SCREW INNER END
ELECTRIC (BR)
65
3.5
ELECTRIC
34.5
NOT FITTED
NOT FITTED
NOT FITTED
SPINDLE-457 DIA.-INNER END ONLY

TRACTION DATA FOR MULTIPLE UNITS

EMU-

VIRRAL & MERSEY

INTRODUCED 1938 & 1956

VOLTAGE

650 VOLTS D.C. THIRD RAIL

TRACTION MOTORS

4 X 135 HP 8TH

BASIC TYPE

EB 203 0A

VARIANTS

NONE
EB 204

BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS

TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
A.V.S.
TRAIN COMMUNICATION
BUFFERS

BASIC TYPE

ALTERNATIVES

ELECTRO PNEUMATIC
CLASS 504 MOTOR
STEEL
AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-AUTOMATIC SOLID SHANK
(ALLIANCE NO. 2) INNER END
ELECTRIC (BR)
65
3.5
ELECTRIC
50
NOT FITTED
NOT FITTED
NOT FITTED
RETRACTABLE SPINDLE-559 X 356 OVAL

TRACTION DATA FOR MULTIPLE UNITS

EMU-
MANCHESTER-BURY. INTRODUCED 1959.

VOLTAGE
1200 VOLTS D.C. THIRD RAIL

TRACTION MOTORS
2 X 141 HP ENGLISH ELECTRIC

BASIC TYPE
EB 204 0A

VARIANTS
NONE
EB 205

BASIC TYPE

- ELECTRO PNEUMATIC
- CLASS 506 MOTOR
- STEEL
- SCREW
- ELECTRIC (BR)
- 70
- 5.5
- TUNGSTEN
- 52
- NOT FITTED
- NOT FITTED
- NOT FITTED
- SELF CONTAINED-559 OVAL

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS

EMU - MANCHESTER-GLOSSOP-HADFIELD. INTRODUCED 1954.
VOLTAGE 1500 VOLTS D.C. OVERHEAD
TRACTION MOTORS 4 X 185 HP GEC

BASIC TYPE
EB 205 0A

VARIANTS
NONE

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MOTOR BRAKE SECOND

CLASS 309/1

DMBS

EB 207

2667 OVER GUTTERS

3864
OVER VENTS

3175
GUTTER

3899
OVERALL

3772
OVER

1295

14173 BOGIE CENTRES

1295

19329 OVER HEADSTOCKS

5245

791

12623

894

19757 OVER BODY

20180 OVER GANGWAYS-COUPLED

20282 OVER GANGWAYS-UNCOPLED

SEATS
48

TOILETS
-

COMPARTMENTS
-

GUARDS COMPARTMENTS
1

VENTILATION
-

CATERING EQUIPMENT
TROLLEY

ISSUE
2

DATE
MAR 87

Original diagrams courtesy of Eddie Knorn. This PDF copy by J.D. Faulkner, 2012
(visit http://www.barrowmoremrg.co.uk)
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<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<td>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END</td>
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<td>PUBLIC ADDRESS</td>
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**TRACTION DATA FOR MULTIPLE UNITS**

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<td>25 &amp; 6.25 KV A.C. OVERHEAD.</td>
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<tr>
<td>TRACTION MOTORS</td>
<td>4 x 282 HP D.C. GEC</td>
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**BASIC TYPE**

EB 207 OA

**VARIANTS**

NONE
EB 260

**BASIC TYPE**

- AIR
- BP22-WATERLOO & CITY
- STEEL
- WATERLOO & CITY
- ELECTRIC (BR)
- NO RECORD
- 3.5
- ELECTRIC
- 2P
- NOT FITTED
- NOT FITTED
- DRIVER/GUARD
- CENTRE SPRING A END-CENTRE WEARING BLOCK B END

**ALTERNATIVES**

**TRACTION DATA FOR MULTIPLE UNITS**

- EMU- WATERLOO & CITY.
- INTRODUCED 1940
- VOLTAGE 750/850 VOLTS D.C. THIRD RAIL
- TRACTION MOTORS 2 X 190 HP ENGLISH ELECTRIC

**BASIC TYPE**

- EB 260 0A

**VARIANTS**

- NONE
EB 261

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<tr>
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<td>STEEL UNDERFRAME BODY &amp; ROOF-WOODEN BODY FRAMING</td>
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<tr>
<td>Couplings</td>
<td>EX LONDON TRANSPORT</td>
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<tr>
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<td>A.V.S.</td>
<td>FITTED</td>
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<td>Train Communication</td>
<td>DRIVER/GUARD</td>
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<tr>
<td>Buffers</td>
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<tr>
<td>S.R. Design Reference Code</td>
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</table>

TRACTION DATA FOR MULTIPLE UNITS

EMU- ISLE OF VIGHT STOCK. INTRODUCED 1967-EX LONDON TRANSPORT STOCK

Voltage 630 Volts D.C. Third Rail

Traction Motors 2 x 240 HP

BASIC TYPE

EB 261 0A

VARIANTS

1A S.R. Design Reference Code CVDEND, A.V.S. FITTED.
### Basic Type

<table>
<thead>
<tr>
<th>BRAXES</th>
<th>ELECTRO PNEUMATIC</th>
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</thead>
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<tr>
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<td>EX LONDON TRANSPORT</td>
</tr>
<tr>
<td>BODY CONSTRUCTION</td>
<td>STEEL UNDERFRAME BODY &amp; ROOF-WOODEN BODY FRAMING</td>
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<tr>
<td>COUPLINGS</td>
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<td>MAX. SPEED M.P.H.</td>
<td>NO RECORD</td>
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<td>LIGHTING</td>
<td>29</td>
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<tr>
<td>GANDWAYS</td>
<td>FITTED</td>
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<td>A.V.S.</td>
<td>DRIVER/GUARD-PUBLIC ADDRESS</td>
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### Alternatives

| DRIVER/GUARD |
| CV 1AD |

---

### Traction Data for Multiple Units

**EMU-**

ISLE OF WIGHT STOCK. INTRODUCED 1967-EX LONDON TRANSPORT STOCK.

- **VOLTAGE:** 630 VOLTS D.C. THIRD RAIL
- **TRACTION MOTORS:** 2 X 240 HP

---

### Basic Type

| BASIC TYPE | EB 262 0A |

### Variants

1A A.W.S. NOT FITTED, DRIVER/GUARD, S.R. DESIGN REF. CODE CV 1AD

**Visit [http://www.barrowmoremrg.co.uk](http://www.barrowmoremrg.co.uk)**
### Basic Type

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<th>BRAKES</th>
<th>ALTERNATIVES</th>
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<td><strong>AIR</strong></td>
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<tr>
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<td><strong>CENTRAL 1092 MOTOR WHEEL &amp; S.R. STD 229 X 114 (ONE OF EACH)</strong></td>
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<tr>
<td>COUPLINGS</td>
<td><strong>STEEL</strong></td>
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<tr>
<td>TRAIN HEATING</td>
<td><strong>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END 3 LINK INNER END</strong></td>
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<td>MX.Speed M.P.H.</td>
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<td>MN.RAD. CURVE CHAINS</td>
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<td>GANGWAYS</td>
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<td>A.W.S.</td>
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<tr>
<td>TRAIN COMMUNICATION</td>
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<tr>
<td>BUFFERS</td>
<td><strong>SELF CONTAINED SPENCER MOULTON OUTER END CENTRE WEARING PLATE</strong></td>
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### Traction Data for Multiple Units

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### Basic Type

- **EB 265 2C**

### Variants

- 2D SR DESIGN REF. CODE CM.
EB 266

BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX.SPEED M.P.H.
MIN_RAD.CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
A.W.S.
TRAIN COMMUNICATION
BUFFERS
S.R.DESIGN REFERENCE CODE

BASIC TYPE

ELECTRO PNEUMATIC
CENTRAL 916 MOTOR WHEEL & S.R.STANDARD 229 X 114(ONE OF EACH)
STEEL
AUTOMATIC DROPEHEAD(BUCKEYE) OUTER END-3 LINK INNER END
ELECTRIC (BR)
75
3.5
TUNGSTEN
40
NOT FITTED
NOT FITTED
DRIVER/GROUND
RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END-CENTRE WEARING PLATE
INNER END
CP

ALTERNATIVES

FITTED
CP 1A

TRACTION DATA FOR MULTIPLE UNITS

EMU-
INTRODUCED-CLASS 415/1 1951-RECLASSED 415/0 1976.

VOLTAGE
750/850 VOLTS D.C. THIRD RAIL

TRACTION MOTORS
2 X 250 HP ENGLISH ELECTRIC

BASIC TYPE

EB 266 OA

VARIANTS

2A A.W.S.FITTED
3A S.R.DESIGN REFERENCE CODE CP 1A, A.W.S.FITTED.
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<tr>
<td>BOGIE/SUSPENSION</td>
<td>CENTRAL 916 MOTOR WHEEL &amp; S.R.STANDARD 229 X 114 (ONE OF EACH)</td>
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<tr>
<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
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<tr>
<td>COUPLINGS</td>
<td>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END - 3 LINK INNER END</td>
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<tr>
<td>TRAIN HEATING</td>
<td>ELECTRIC (BR)</td>
</tr>
<tr>
<td>MAX SPEED M.P.H.</td>
<td>CLASS 415/1 &amp; 416/1 75 - CLASS 418/0 90</td>
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<tr>
<td>MIN RAD CURVE CHAINS</td>
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<tr>
<td>LIGHTING</td>
<td>TUNGSTEN</td>
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<tr>
<td>TARE WEIGHT TONES</td>
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<tr>
<td>GANGWAYS</td>
<td>NOT FITTED</td>
</tr>
<tr>
<td>A W S.</td>
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<tr>
<td>TRAIN COMMUNICATION</td>
<td>PUBLIC ADDRESS WITH TRANSMITTER</td>
</tr>
<tr>
<td>BUFFERS</td>
<td>RETRACTABLE SPINDLE - 559 X 356 OVAL OUTER END CENTRE WEARING PLATE</td>
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<tr>
<td>S.R. DESIGN REFERENCE CODE</td>
<td>INNER END</td>
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<tr>
<td></td>
<td>CP 1AE</td>
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<td>CP 1AS</td>
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**TRACTION DATA FOR MULTIPLE UNITS**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DETAILS</th>
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<tbody>
<tr>
<td>EMU-</td>
<td>INTRODUCED - CLASS 415/1 1951 - CLASS 416/1 1959 - CLASS 418/0 1957 AS CLASS 414/1 &amp; RECLASSED 1976</td>
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<td>VOLTAGE</td>
<td>750/850 VOLTS D.C. THIRD RAIL</td>
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<td>TRACTION MOTORS</td>
<td>2 X 250 HP ENGLISH ELECTRIC</td>
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**BASIC TYPE**

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<td>EB 267</td>
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**VARIANTS**

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BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX.SPEED M.P.H.
MIN.RAD.CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
A.W.S.
TRAIN COMMUNICATION
BUFFERS
S.R.DESIGN REFERENCE CODE

BASIC TYPE

ELECTRO PNEUMATIC
S.R.MK 3D POWERED & UNPOWERED (ONE OF EACH)
STEEL
AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-3 LINK INNER END
ELECTRIC (BR)
CLASS 415/1, 415/2, 416/2 75-CLASS 414/2, 418/1 90
3.5
TUNGSTEN
42
NOT FITTED
NOT FITTED
DRIVER/ GUARD
RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END-CENTRE WEARING PLATE INNER END
CO

ALTERNATIVES

S.R.MK 4 POWERED & UNPOWERED (ONE OF EACH)

Traction data for multiple units

EMU-

VOLTAGE
750/850 VOLTS D.C. THIRD RAIL

TRACTION MOTORS
2 X 250 HP ENGLISH ELECTRIC

VARIANTS

1A S.R.DESIGN REFERENCE CODE CO 1A
4A A.W.S. FITTED.
5A S.R.DESIGN REFERENCE CODE CO 1A, A.W.S. FITTED.
6B S.R.DESIGN REFERENCE CODE CO 3A, S.R.MK 4 POWERED & UNPOWERED BOWIES (ONE OF EACH), A.W.S. FITTED.
DRIVING MOTOR BRAKE SECOND

CLASS 414/3
413/3
DMBS
EB 270

SEATS
84
TOILETS
-
COMPARTMENTS
-
GUARDS COMPARTMENTS
1
VENTILATION
-
CATERING EQUIPMENT
-

46'6" Bogie coach.
63'5" Over Headstocks.
65'8" Over Buffer when extended.

63'11½" Over Body.

5'6" Car

Guards & Luggage Comps

Non Smoking

Non Smoking

4'2½" 6'11½" 6'3½" 6'3½" 6'3½" 6'3½" 6'3½" 6'3½"

12' 6" Overall
7'6" Over Steps.
9'0" Over Body & Stepboards.
9'3½" Overall.

5'8½" to Top of Roof.

ORIGINAL DIAGRAMS FOR REFERENCE:
BR 400

ISSUE
5
DATE
NOV'84

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(visit http://www.barrowmoremrg.co.uk)
EB 270

BRAKES
Bogie/Suspension

BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONES
GANDWAYS
A.W.S.
TRAIN COMMUNICATION
BUFFERS
S.R. DESIGN REFERENCE CODE

BASIC TYPE
ELECTRO PNEUMATIC
S.R. MK 4 POWERED & UNPOWERED (ONE OF EACH)

STEEL
AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-3 LINK INNER END
ELECTRIC (BR)
30
3.5
42
NOT FITTED
NOT FITTED
DRIVER/GUARD
RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END-CENTRE WEARING PLATE INNER END
CU, CU 1A

ALTERNATIVES
S.R. MK 3B POWERED & COMMONWEALTH UNPOWERED (ONE OF EACH), S.R. MK 4 POWERED & COMMONWEALTH UNPOWERED (ONE OF EACH)

TRACTION DATA FOR MULTIPLE UNITS
EMU-

VOLTAGE
750/850 VOLTS D.C. THIRD RAIL

TRACTION MOTORS
2 X 250 HP ENGLISH ELECTRIC

BASIC TYPE
EB 270 0A

VARIANTS
1B S.R. MK 3B POWERED & COMMONWEALTH UNPOWERED BOGIES (ONE OF EACH), S.R. DESIGN REFERENCE CODE CU, A.W.S. FITTED.
2C S.R. MK 4 POWERED & COMMONWEALTH UNPOWERED BOGIES (ONE OF EACH), S.R. DESIGN REFERENCE CODE CU 1A, A.W.S. FITTED.
3A A.W.S. FITTED.
EB 271

**BASIC TYPE**

**ALTERNATIVES**

**BRAKES**

**ELECTRO PNEUMATIC**

**S.R.MK 3D POWERED & UNPOWERED (ONE OF EACH)**

**ELECTRO PNEUMATIC-LAYCOCK KNORR EQUIPMENT**

**S.R.MK 3D POWERED & S.R.MK 3C UNPOWERED (ONE OF EACH)**

**S.R.MK 3C POWERED & UNPOWERED (ONE OF EACH)**

**S.R.MK 4 POWERED & COMMONWEALTH UNPOWERED (ONE OF EACH).**

**BODY CONSTRUCTION**

**STEEL**

**AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-3 LINK INNER END**

**CLASS 414/3 90-CLASS 415/2 75**

**TUNGSTEN**

**41**

**DRIVER/GUARD**

**NOT FITTED**

**NOT FITTED**

**Fitted**

**GANGWAYS**

**A.W.S.**

**TRAIN COMMUNICATION**

**BUFFERS**

**RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END-CENTRE WEARING PLATE INNER END**

**S.R.DESIGN REFERENCE CODE BEARINGS**

**CS S**

**OIL**

**CS E, CS 1AS ROLLER**

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU**

**INTRODUCED 1957, 415/2 RECLASSED 1984.**

**VOLTAGE**

**750/850 VOLTS D.C. THIRD RAIL**

**TRACTION MOTORS**

**2 X 250 HP ENGLISH ELECTRIC**

**BASIC TYPE**

**EB 271 0A**

**VARIANTS**

**OB S.R.DESIGN REFERENCE CODE CS E:**

**OC S.R.DESIGN REFERENCE CODE CS E S.R.MK 3D POWERED & S.R.MK 3C UNPOWERED Bogies (ONE OF EACH).**

**OD S.R.MK 3C POWERED & UNPOWERED Bogies (ONE OF EACH).**

**OE S.R.MK 3C POWERED & UNPOWERED Bogies (ONE OF EACH). ROLLER BEARINGS.**

**OF S.R.DESIGN REFERENCE CODE CS E S.R.MK 4 POWERED & COMMONWEALTH Bogies (ONE OF EACH). ROLLER BEARINGS.**

**OD S.R.MK 3C POWERED & UNPOWERED Bogies (ONE OF EACH).**

**OE S.R.MK 3C POWERED & UNPOWERED Bogies (ONE OF EACH). ROLLER BEARINGS, A.W.S. FITTED.**

**OF S.R.DESIGN REFERENCE CODE CS E S.R.MK 4 POWERED & COMMONWEALTH Bogies (ONE OF EACH). ELECTRO PNEUMATIC BRAKES WITH LAYCOCK KNORR EQUIPMENT, A.W.S. FITTED.**

**OD S.R.MK 3C POWERED & UNPOWERED Bogies (ONE OF EACH). ELECTRO PNEUMATIC BRAKES WITH LAYCOCK KNORR EQUIPMENT, A.W.S. FITTED, ROLLER BEARINGS.**

**2A A.W.S. FITTED.**

**2B S.R.DESIGN REFERENCE CODE CS E A.W.S. FITTED.**

**2D S.R.MK 3C POWERED & UNPOWERED Bogies (ONE OF EACH). A.W.S. FITTED.**
EB 272

**BRAKES**

**BOGIE/SUSPENSION**

**BASIC TYPE**

ELECTRO PNEUMATIC
S.R.MK 3D POWERED & UNPOWERED (ONE OF EACH)

**STEEL**

AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-3 LINK INNER END
ELECTRIC (BR)
75
3.5
TUNGSTEN
41
NOT FITTED
NOT FITTED
DRIVER/GUARD
RETRACTABLE SPINDLE - 559 X 356 OVAL OUTER END-CENTRE WEARING PLATE
INNER END
CT S
OIL

**ALTERNATIVES**

ELECTRO PNEUMATIC-LAYCOCK KNORR EQUIPMENT

Fitted

CT E, CT 1A5
ROLLER

**BODY CONSTRUCTION**

**COUPLINGS**

**TRAIN HEATING**

**MAX. SPEED M.P.H.**

**MIN. RAD. CURVE CHAINS**

**LIGHTING**

**TARE WEIGHT TUNNES**

**GANGWAYS**

**A.W.S.**

**TRAIN COMMUNICATION**

**BUFFERS**

**S.R.DESIGN REFERENCE CODE BEARINGS**

**traction data for multiple units**

**EMU - INTRODUCED 1957, RECLASSED 1984.**

**VOLTAGE**

750/850 VOLS D.C. THIRD RAIL

**TRACTION MOTORS** 2 X 250 HP ENGLISH ELECTRIC

**basic type**

EB 272 0A

**Variants**

00 S.R.DESIGN REFERENCE CODE CT E,
0C S.R.DESIGN REFERENCE CODE CT E, S.R.MK 3D POWERED & S.R.MK 3C UNPOWERED BOGIES (ONE OF EACH).
0D S.R.MK 3C POWERED & UNPOWERED BOGIES (ONE OF EACH).
0E S.R.MK 3C POWERED & UNPOWERED BOGIES (ONE OF EACH), ROLLER BEARINGS.
1D S.R.DESIGN REFERENCE CODE CT 1A5, S.R.MK 3C POWERED & UNPOWERED BOGIES (ONE OF EACH), A.W.S. FITTED.
1E S.R.DESIGN REFERENCE CODE CT 1A5, S.R.MK 3C POWERED & UNPOWERED BOGIES (ONE OF EACH), ROLLER BEARINGS, A.W.S. FITTED.
1G S.R.DESIGN REFERENCE CODE CT 1A5, S.R.MK 3C POWERED & UNPOWERED BOGIES (ONE OF EACH), ELECTRO PNEUMATIC BRAKES WITH LAYCOCK KNORR EQUIPMENT, A.W.S. FITTED.
2A A.W.S. FITTED.
2B S.R.DESIGN REFERENCE CODE CT E, A.W.S. FITTED.
2D S.R.MK 3C POWERED & UNPOWERED (ONE OF EACH), A.W.S. FITTED.
2F S.R.MK 4 POWERED & COMMONWEALTH UNPOWERED BOGIES (ONE OF EACH) ELECTRO PNEUMATIC BRAKE WITH LAYCOCK KNORR EQUIPMENT, ROLLER BEARINGS, A.W.S. FITTED.
BRAKES
Bogie/Suspension

BODY CONSTRUCTION
Couplings

TRAIN HEATING
Max.Speed M.p.h.
Min.Rad.Curve Chains
Lighting
Tare Weight Tonnes
Gangways
A.W.S.
Train Communication
Buffers
S.R. Design Reference Code
Bearings

**BASIC TYPE**
- Electro Pneumatic
- S.R. Mk 4 Powered & Unpowered (one of each)
- Steel
- Automatic Drophead (Buckeyes) Outer End - Automatic Solid Shank (Alliance No.2) Inner End - Electric (BR)
- 3.5 Tungsten
- 41 Express Electric
- Not Fitted
- Driver/Guard
- Retractible Spindle - 559 x 356 Oval - Outer End Only
- AB Oil

**ALTERNATIVES**
- S.R. Mk 4 Powered & Commonwealth Unpowered (one of each)

**TRACTION DATA FOR MULTIPLE UNITS**

EMU
- Introduced 1956

Voltage
- 750/850 Volts D.C. Third Rail

Traction Motors
- 2 x 250 HP English Electric

**BASIC TYPE**
- EB 273 DA

**VARIANTS**
- OB Roller Bearings
- DC S.R. Mk 4 Powered & Commonwealth Bogies (one of each), Roller Bearings
DRIVING MOTOR BRAKE SECOND

CLASS 410/2
411/2

DMBS
EB 274

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### BASIC TYPE

**EB 274 BR**

**BRAKES**
- Disconnect type
- Small device

**COUPLINGS**
- Steel
- Steel
- Steel

**TRAIN HEATING**
- MAX SPEED M.P.H.
- MIN. RADIUS CURVE CHAINS
- LIGHTING
- TARE WEIGHT TONNES
- GANGWAYS
- A.W.S.
- TRAIN COMMUNICATION
- BUFFERS
- S.R. DESIGN REFERENCE CODE

### ALTERNATIVES

**BASIC TYPE**
- ELECTRO PNEUMATIC
- S.R.MK 4 POWERED & COMMONWEALTH UNPOWERED (ONE OF EACH)
- STEEL
- AUTOMATIC DROPHEAED (BUCKEYE) OUTER END
- AUTOMATIC SOLID SHANK (ALLIANCE NO. 2) INNER END
- ELECTRIC (BR)
  - 90
  - 3.5
  - TUNGSTEN
  - 41
- EXPRESS ELECTRIC
- NOT FITTED
- DRIVER/ GUARD
- RETRACTABLE SPINDLE 559 X 356 OVAL - OUTER END ONLY
- AG

### TRACTION DATA FOR MULTIPLE UNITS

**EMU**
  - VOLTAGE
    - 750/850 VOLTS D.C. THIRD RAIL.
  - TRACTION MOTORS
    - 2 X 250 HP ENGLISH ELECTRIC.

**VARIANTS**
- NONE

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BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max.Speed M.P.H.
Min.Rad.Curve Chains
Lighting
Tare Weight Tonnes
Gangways
A.W.S.
Train Communication
Buffers
S.R. Design Reference Code

BASIC TYPE

Electro Pneumatic
Central 1016 Motor Wheel & S.R. Standard 229 x 114 (One of Each)
Steel
Automatic Drophead (Buckeye) Outer End - Three Link Inner End
Electric (BR)
75
3.5
Fluorescent & Tungsten
40
Not Fitted
Not Fitted
Driver/Guard-Public Address with Transmitter
Retractable Spindle (159 x 356 Oval) Outer End - Centre Wearing Plate
Inner End
Cx

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS

EMU


Voltage
750/850 Volts D.C. Third Rail

Traction Motors
2 x 250 HP English Electric

BASIC TYPE

EB 277 OA Refurbished

VARIANTS

NONE
**BRAKES**
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max. Speed M.P.H.
Min. Radii, Curve Chains
Lighting
Tare Weight Tonnes
Gangways
A.W.S.
Train Communication
Buffers
S.R. Design Reference Code

**BASIC TYPE**
ELECTRO PNEUMATIC
CENTRAL 916 MOTOR WHEEL & SR STANDARD 223X114 (ONE OF EACH)
STEEL
AUTOMATIC DROP HEAD (BUCKEYE) OUTER END-3 LINK INNER END
ELECTRIC (BR)
75
3.5
FLUORESCENT & TUNGSTEN
40
NOT FITTED
Fitted
Driver/Guard & Public Address with Transmitter
Retractable Spindle-559X356 Oval-Outer End-Centre Wearing Plate
Inner End
CX 1A

**ALTERNATIVES**
CP 1AE, CP 2AE

**TRACTION DATA FOR MULTIPLE UNITS**
EMU-

**VOLTAGE**
750/850 Volts D.C., Third Rail

**TRACTION MOTORS**
2 x 250 HP ENGLISH ELECTRIC

**BASIC TYPE**
EB 278 0A

**VARIANTS**
1B S.R. Design Reference Code CP 1AE.
2B S.R. Design Reference Code CP 2AE.
EB 279

**BRAKES**
- ELECTRO PNEUMATIC
- SR MK 3D POWERED & UNPOWERED (ONE OF EACH)
- STEEL AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-3 LINK INNER END
- ELECTRIC (BR) 75
- 3.5 FLUORESCENT & TUNGSTEN
- 40.5 NOT FITTED
- FITTED
- DRIVER/GUARD & PUBLIC ADDRESS WITH TRANSMITTER
- RETRACTABLE SPINDLE-559X356 OVAL-OUTER END-CENTRE WEARING PLATE INNER END

**TRACTION DATA FOR MULTIPLE UNITS**
- EMU- INTRODUCED 1953, REFURBISHED 1980/81
- VOLTAGE 750/850 VOLTS D.C. THIRD RAIL
- TRACTION MOTORS 2 X 250 HP ENGLISH ELECTRIC

**BASIC TYPE**
- EB 279 OA

**VARIANTS**
- NONE
EB 280

<table>
<thead>
<tr>
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<th>ALTERNATIVES</th>
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<td>SR Mk 4 Powered &amp; Unpowered (One of Each)</td>
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<td>SR Mk 3D Powered &amp; Unpowered (One of Each)</td>
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<td>STEEL</td>
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<td>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END</td>
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<td>3 LINK INNER END</td>
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<td>ELECTRIC (BR)</td>
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<td>FLUORESCENT &amp; TUNGSTEN</td>
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<td>42</td>
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<td>NOT FITTED</td>
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<td>FITTED</td>
<td></td>
</tr>
<tr>
<td>DRIVER/GUARD &amp; PUBLIC ADDRESS WITH TRANSMITTER</td>
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</tr>
<tr>
<td>RETRACTABLE SPINDLE - 559X356 OVAL OUTER END - CENTRE WEARING PLATE</td>
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<td>INNER END</td>
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<tr>
<td>CY 2A</td>
<td>CY 2A</td>
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</table>

TRACTION DATA FOR MULTIPLE UNITS

EMU - INTRODUCED 1954, REFURBISHED 1980/81

VOLTAGE 750/850 VOLTS D.C. THIRD RAIL

TRACTION MOTORS 2 X 250 HP ENGLISH ELECTRIC

BASIC TYPE

EB 280 0A

VARIANTS

18 SR DESIGN REF CODE CY 2A, SR Mk 4 Powered & Unpowered Bogies (One of Each).
EB 281

**BRAKES**

**BODY CONSTRUCTION**

**COUPLINGS**

**TRAIN HEATING**

**MAX. SPEED M.P.H.**

**MIN. RAD. CURVE CHAINS**

**LIGHTING**

**TARE WEIGHT TONNES**

**GANGWAYS**

**A.W.S.**

**TRAIN COMMUNICATION**

**BUFFERS**

**S.R. DESIGN REFERENCE CODE**

**BASIC TYPE**

**ALTERNATIVES**

ELECTRO PNEUMATIC

S.R. MK 3D POWERED & UNPOWERED (ONE OF EACH)

STEEL

AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-3 LINK INNER END

ELECTRIC (BR)

75

3.5

FLUORESCENT & TUNGSTEN

42

NOT FITTED

NOT FITTED

FITTER

DRIVER/GUARD

RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END-CENTRE WEARING PLATE INNER END

CY-3B

---

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU**

INTRODUCED 1954 REFURBISHED 1980 / 1 CONVERTED TO REVENUE PROTECTED UNITS 1986

**VOLTAGE**

750/850 VOLTS D.C. THIRD RAIL

**TRACTION MOTORS**

2 x 250 HP ENGLISH ELECTRIC

---

**BASIC TYPE**

EB 281 DA

**VARIANTS**

1A A.W.S. FITTED.
### BASIC TYPE

<table>
<thead>
<tr>
<th>Component</th>
<th>Alternative</th>
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<tbody>
<tr>
<td>Brakes</td>
<td>Electro pneumatic</td>
</tr>
<tr>
<td>Bogie/suspension</td>
<td>BP20c &amp; BP20d (one of each)</td>
</tr>
<tr>
<td>Body construction</td>
<td>Steel</td>
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<tr>
<td>Couplings</td>
<td>Bar</td>
</tr>
<tr>
<td>Train heating</td>
<td>Electric (BR) with pressure ventilation &amp; heating</td>
</tr>
<tr>
<td>Max speed m.p.h.</td>
<td>90</td>
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<tr>
<td>Min. radius curve chains</td>
<td>3.5</td>
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<tr>
<td>Lighting</td>
<td>Fluorescent</td>
</tr>
<tr>
<td>Tare weight tonnes</td>
<td>49</td>
</tr>
<tr>
<td>Gangways</td>
<td>Flexible diaphragm/ rigid (GRP)</td>
</tr>
<tr>
<td>Train communication</td>
<td>Public address</td>
</tr>
<tr>
<td>Buffers</td>
<td>Not fitted</td>
</tr>
</tbody>
</table>

### Traction Data for Multiple Units

For St. Pancras & Moorgate-Bedford:
- **Voltage**: 25 kV A.C. Overhead
- **Traction Motors**: 4 x 332 HP GEC G315BZ

### Basic Type

- **EC 202 OA**

### Variants

- None
**EC 203**

<table>
<thead>
<tr>
<th>Basic Type</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electro-Pneumatic</td>
<td>Brush</td>
</tr>
<tr>
<td>BP27</td>
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<tr>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>BAR</td>
<td></td>
</tr>
<tr>
<td>Electric with Pressure Ventilation &amp; Heating</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td></td>
</tr>
<tr>
<td>3.5</td>
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<tr>
<td>Fluorescent</td>
<td></td>
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<tr>
<td>45.6</td>
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<tr>
<td>Flexible Diaphragm/Rigid Rigid</td>
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<tr>
<td>Public Address</td>
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<tr>
<td>Not Fitted</td>
<td></td>
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<tr>
<td>G.E.C.</td>
<td></td>
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</tbody>
</table>

**Traction Data for Multiple Units**

EMU-3

SOUTHERN REGION ROUTES. INTRODUCED 1982.

**Voltage**
750 Volts D.C. Third Rail

**Traction Motors**
4 x 205 HP English Electric 507-20J

**Basic Type**
EC 203 OA

**Variants**
1A Brush M.A.S.E.T.
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAKES</td>
<td>ELECTRO PNEUMATIC</td>
</tr>
<tr>
<td>BOGIE/SUSPENSION</td>
<td>EDT</td>
</tr>
<tr>
<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
</tr>
<tr>
<td>COUPLINGS</td>
<td>AUTOMATIC SOLID SHANK (BUCKEYE)</td>
</tr>
<tr>
<td>TRAIN HEATING</td>
<td>ELECTRIC (BR)</td>
</tr>
<tr>
<td>MAX. SPEED M.P.H.</td>
<td>75</td>
</tr>
<tr>
<td>MIN. RAD. CURVE CHAINS</td>
<td>3.5</td>
</tr>
<tr>
<td>LIGHTING</td>
<td>FLUORESCENT</td>
</tr>
<tr>
<td>TARE WEIGHT TONNES</td>
<td>47.5</td>
</tr>
<tr>
<td>GANGWAYS</td>
<td>PULLMAN WITH RIGID (GRP) INNER PANELS</td>
</tr>
<tr>
<td>A.W.S.</td>
<td>FITTED</td>
</tr>
<tr>
<td>TRAIN COMMUNICATION</td>
<td>PUBLIC ADDRESS</td>
</tr>
<tr>
<td>BUFFERS</td>
<td>CENTRE</td>
</tr>
<tr>
<td>BRAKE BLOCKS</td>
<td>CAST IRON</td>
</tr>
</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**


- **VOLTAGE**: 25 & 6.25 KV A.C. OVERHEAD
- **TRACTION MOTORS**: 4 X 174 HP D.C. GE

**BASIC TYPE**

EC 204 0A

**VARIANTS**

0B COMPOSITION BRAKE BLOCKS
EC 205

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tbody>
<tr>
<td>ELECTRO-PNEUMATIC</td>
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<tr>
<td>BP20e &amp; BP20f(ONE OF EACH)</td>
<td>STEEL</td>
</tr>
<tr>
<td>STEEL</td>
<td>AUTOMATIC TIGHTLOCK OUTER END-BAR INNER END</td>
</tr>
<tr>
<td>Electric (DR)</td>
<td>90</td>
</tr>
<tr>
<td>3.5</td>
<td>FLUORESCENT &amp; TUNGSTEN</td>
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<tr>
<td>49</td>
<td>CENTRALLY SUPPORTED-SWIVELLING-FLEXIBLE DIAPHRAGM-STEEL FACE PLATE</td>
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<tr>
<td></td>
<td>OUT SER END-FLEXIBLE DIAPHRAGM/RIGID(GRP) INNER END</td>
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<td></td>
<td>FITTED</td>
</tr>
<tr>
<td></td>
<td>DRIVER/SIGNAL BOX-DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER</td>
</tr>
<tr>
<td></td>
<td>NOT FITTED</td>
</tr>
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TRACTION DATA FOR MULTIPLE UNITS

EMU - GREAT NORTHERN OUTER SUBURBAN

VOLTAGE 25 KV A.C. OVERHEAD

BASIC TYPE

EC 205 DA

VARIANTS

NONE
MOTOR STANDARD

CLASS 455/4

MS

EC 206

14170 BOGIE CENTRES

19330 OVER HEADSTOCKS

2816 OVER BODY

3714

2734 OVER TREADPLATES

19920 OVER BODY

5300  1600  5380  1600  5300

1010 THRO'WAY

1010 THRO'WAY

SEATS 84
TOILETS -
COMPARTMENTS -
GUARDS COMPARTMENTS -
VENTILATION -
CATERING EQUIPMENT -

ISSUE 2
DATE MAR 88
**BRAKES**
- ELECTRO-PNEUMATIC

**COUPLINGS**
- STEEL

**MAX. SPEED M.P.H.**
- 76

**MIN. RADIUS CURVE CHAINS**
- 3.5

**LIGHTING**
- FLUORESCENT

**LOADING TONE TONNES**
- 45.6

**GANGWAYS**
- FLEXIBLE DIAPHRAM/ RIGID (GRP)

**TRAIN COMMUNICATION**
- PUBLIC ADDRESS

**BUFFERS**
- NOT FITTED

**M.A. SET**
- BRUSH

---

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU**
- SOUTHERN REGION ROUTES. INTRODUCED 1985

**VOLTAGE**
- 750 VOLTS D.C. THIRD RAIL

**TRACTION MOTORS**
- 4 X 205 HP ENGLISH ELECTRIC 507-20J

---

**BASIC TYPE**
- EC 206 0A

**VARIANTS**
- NONE
MOTOR SECOND

CLASS 318

LOCKED DOWN PANTOGRAPH
HEIGHT 3775 ABOVE RAIL LEVEL

OVER BODY

14170 Bogie Centres

19330 OVER HEADSTOCKS

19920 OVER BODY

5460 1280 5080

1280 5700 1280

SEATS

TOILETS

COMPARTMENTS

GUARDS COMPARTMENTS

VENTILATION

CATERING EQUIPMENT

79

Third Bay

Third Bay

ISSUE 1
DATE OCT 86

(visit http://www.barrowmoremrg.co.uk)
BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX.SPEED M.P.H.
MIN.RAD.CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
CANGWAYS
A.W.S.
TRAIN COMMUNICATION
BUFFERS

**BASIC TYPE**

<table>
<thead>
<tr>
<th>ELECTRO-PNEUMATIC</th>
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<tr>
<td>BP20 e &amp; BP20+ (ONE OF EACH)</td>
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<td>STEEL</td>
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<tr>
<td>AUTOMATIC TIGHTLOCK OUTER END-BAR INNER END</td>
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<td>ELECTRIC (BR)</td>
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<tr>
<td>90</td>
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<tr>
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<tr>
<td>FLUORESCENT &amp; TUNGSTEN</td>
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<td>CENTRALLY SUPPORTED-SWIVELLING-FLEXIBLE DIAPHRAGM-STEEL FACE PLATE</td>
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**ALTERNATIVES**

**TRACTION DATA FOR MULTIPLE UNITS**

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<th>EMU-</th>
<th>GLASGOW AREA</th>
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<td>VOLTAGE</td>
<td>25 KV A.C. OVERHEAD</td>
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**BASIC TYPE**

| EC 20T OA |

**VARIANTS**

NONE
MOTOR STANDARD (PANTOGRAPH)

LOCKED DOWN PANTOGRAPH
HEIGHT 3775 ABOVE RAIL LEVEL

14170 BOGIE CENTRES
19330 OVER HEADSTOCKS

19920 OVER BODY

5460 1280 5700 1280 5080 380

SEATS 81
TOILETS -
COMPARTMENTS -
GUARDS COMPARTMENTS -
VENTILATION -
CATERING EQUIPMENT -

1010 THRO'WAY
1010 THRO'WAY

OVER BODY
OVER TREADPLATES

ISSUE 1
DATE JAN 88

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BRAKES
- ELECTRO-PNEUMATIC
- PT-4d & PT-4a (ONE OF EACH)
- STEEL
- BAR
- ELECTRIC (BR)
- 100
- 3.5
- FLUORESCENT
- 49.2
- FLEXIBLE DIAPHRAGM/RIGID (GRP)
- FITTED
- PUBLIC ADDRESS
- NOT FITTED

TRACTION DATA FOR MULTIPLE UNITS

EMU-
- CROSS LONDON SERVICES
- INTRODUCED 1987

VOLTAGE
- 25 KV A.C. OVERHEAD & 750V D.C. THIRD RAIL

BASIC TYPE
- EC 209 OA

VARIANTS
- NONE
MOTOR STANDARD (PANTOGRAPH)
EC 210

BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max. Speed M.P.H.
Min. Radar Curve Metres
Lighting
Tare Weight Tonnes
Gangsaws
A.W.S.
Train Communication
Buffers

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tbody>
<tr>
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<td>PT-4c &amp; PT-4d (one of each)</td>
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<td>Steel</td>
<td></td>
</tr>
<tr>
<td>Bar</td>
<td></td>
</tr>
<tr>
<td>Electric (BR)</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
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<td>71</td>
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<td>Fluorescent</td>
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<td>31.5</td>
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<td>Flexible Diaphragm/Glass</td>
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<td>Fitted</td>
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<td>Public Address</td>
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<td>Not Fitted</td>
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</table>

TRACTION DATA FOR MULTIPLE UNITS

EMU - Anglia Electrics introduced 1988/89

Voltage 25 kV A.C. Overhead

BASIC TYPE
EC 210 0A

VARIANTS
None
## BASIC TYPE

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<thead>
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<td>GRESLEY ED3</td>
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<tr>
<td>STEEL</td>
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<tr>
<td>AUTOMATIC SOLID SHANK (ALLIANCE NO. 2)</td>
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<tr>
<td>ELECTRIC (BR)</td>
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<tr>
<td>75</td>
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<td>3.5</td>
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<tr>
<td>ELECTRIC</td>
</tr>
<tr>
<td>56</td>
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</table>

### TRACTION DATA FOR MULTIPLE UNITS

EMU- GLASGOW AREA. INTRODUCED 1960.

- **VOLTAGE**: 25 & 6.25 KV A.C. OVERHEAD
- **TRACTION MOTORS**: 4 x 27 HP D.C. A.E.I.

### BASIC TYPE

ED 201 0A

### VARIANTS

NONE
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tbody>
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<tr>
<td>BOGIE/SUSPENSION</td>
<td>GRESLEY ED4</td>
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<tr>
<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
</tr>
<tr>
<td>COUPLINGS</td>
<td>AUTOMATIC SOLID SHANK (ALIANCE NO.2)</td>
</tr>
<tr>
<td>TRAIN HEATING</td>
<td>ELECTRIC (BR)</td>
</tr>
<tr>
<td>MAX. SPEED M.P.H.</td>
<td>75</td>
</tr>
<tr>
<td>MIN. RAD. CURVE CHAINS</td>
<td>3.5</td>
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<tr>
<td>LIGHTING</td>
<td>ELECTRIC</td>
</tr>
<tr>
<td>TARE WEIGHT TONNES</td>
<td>54.5</td>
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<tr>
<td>GANGWAYS</td>
<td>NOT FITTED</td>
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<tr>
<td>TRAIN COMMUNICATION</td>
<td>NOT FITTED</td>
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<tr>
<td>BUFFERS</td>
<td>NOT FITTED</td>
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</tbody>
</table>

TRACTION DATA FOR MULTIPLE UNITS

EMU: EUSTON-BIRMINGHAM-MANCHESTER & LIVERPOOL. INTRODUCED 1960

- VOLTAGE: 25 KV A.C. OVERHEAD
- TRACTION MOTORS: 4 X 207 HP D.C. A.E.I.

BASIC TYPE

ED 203 0A

VARIANTS

NONE
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAKES</td>
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</tr>
<tr>
<td>Bogie/Suspension</td>
<td>GRESLEY EDS</td>
</tr>
<tr>
<td>Body Construction</td>
<td>STEEL</td>
</tr>
<tr>
<td>Couplings</td>
<td>AUTOMATIC SOLID SHANK (ALLIANCE NO. 2)</td>
</tr>
<tr>
<td>Train Heating</td>
<td>ELECTRIC (BR)</td>
</tr>
<tr>
<td>Max. Speed M.P.H.</td>
<td>75</td>
</tr>
<tr>
<td>Min. Rad. Curve Chains</td>
<td>3.5</td>
</tr>
<tr>
<td>Lighting</td>
<td>FLUORESCENT &amp; TUNGSTEN</td>
</tr>
<tr>
<td>Tare Weight Tonnes</td>
<td>55</td>
</tr>
<tr>
<td>Gangways</td>
<td>NOT FITTED</td>
</tr>
<tr>
<td>Train Communication</td>
<td>NOT FITTED</td>
</tr>
<tr>
<td>Buffers</td>
<td>NOT FITTED</td>
</tr>
<tr>
<td>Brake Blocks</td>
<td>CAST IRON</td>
</tr>
<tr>
<td>PUBLIC ADDRESS WITH TRANSMITTER</td>
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</tr>
<tr>
<td>COMPOSITION</td>
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</tbody>
</table>

**Traction Data for Multiple Units**


- **Voltage**: 25 & 6.25 KV A.C. OVERHEAD
- **Traction Motors**: 4 X 200 HP D.C. GEC

**Basic Type**

ED 204 OA - REFURBISHED

**Variants**

- 0B - REFURBISHED COMPOSITION BRAKES BLOCKS.
- 1C - REFURBISHED, PUBLIC ADDRESS WITH TRANSMITTER.
- 1D - REFURBISHED, PUBLIC ADDRESS WITH TRANSMITTER, COMPOSITION BRAKES BLOCKS.
MOTOR BRAKE SECOND

CLASS 302

MBS

ED 205

SEATS 96
TOILETS -
COMPARTMENTS 8
GUARD'S COMPARTMENTS 1
VENTILATION -
CATERING EQUIPMENT -

ORIGINAL DIAGRAMS FOR REFERENCE:-
BR 405

ISSUE DATE
2 AUG'83

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ED 205

BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX SPEED M.P.H.
MIN RAD CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
TRAIN COMMUNICATION
BUFFERS

BASIC TYPE

ED 205 0A

VARIANTS

NONE

ALTERNATIVES

ELECTRO PNEUMATIC
GRESLEY ED2
STEEL
AUTOMATIC SOLID SHANK (ALLIANCE NO. 2)
ELECTRIC (BR)
75
3.5
TUNGSTEN
55
NOT FITTED
NOT FITTED
NOT FITTED

TRACTION DATA FOR MULTIPLE UNITS

EMU-
VOLTAGE
25 & 6.25 KV A.C. OVERHEAD
TRACTION MOTORS
4 X 152 HP D.C. ENGLISH ELECTRIC ELECTRIC

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BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max. Speed M.P.H.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers

BASIC TYPE
Electro Pneumatic
B4/AM10
Steel
Automatic Solid Shank (Buckeye)
Electric (BR)
75
3.5
Electric
Express Electric Inner End Only
Not Fitted
Not Fitted

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS
EMU-
VOLTAGE
25 KV A.C. Overhead
TRACTION MOTORS
4 x 270 HP D.C. English Electric

BASIC TYPE
ED 210 0A

VARIANTS
None
MOTOR BRAKE SECOND

CLASS 311

MBS

ED 211

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(visit http://www.barrowmoremrg.co.uk)
### BASIC TYPE

| ED 211 OA |

### ALTERNATIVES

<table>
<thead>
<tr>
<th>ELECTRO PNEUMATIC</th>
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<tr>
<td>GRESLEY ED11</td>
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<tr>
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<td>ELECTRIC (BD)</td>
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<tr>
<td>TUNGSTEN</td>
</tr>
<tr>
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### TRACTION DATA FOR MULTIPLE UNITS

<table>
<thead>
<tr>
<th>EMU- GLASGOW AREA. INTRODUCED 1967.</th>
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<tbody>
<tr>
<td>VOLTAGE 25 &amp; 6.25 KV A.C. OVERHEAD</td>
</tr>
<tr>
<td>TRACTION MOTORS 4 X 222 HP D.C. A.E.I.</td>
</tr>
</tbody>
</table>

### VARIANTS

| NONE |

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MOTOR BRAKE SECOND

CLASS 312/0

MBS

ED 212

46'-6" BOGIE CENTRES
63'-5" OVER HEADSTOCKS
65'-4½" OVER BODY

8'-6" OVER BODY STEPBOARDS
9'-0" OVER BODY STEPBOARDS
9'-3" OVERALL

66'-23 (COUPLED)
66'-6½ (UNCOPLED)

SEATS 68
TOILETS -
COMPARTMENTS -
GUARDS COMPARTMENTS 1
VENTILATION -
CATERING EQUIPMENT -

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<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
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<tr>
<td>ELECTRO PNEUMATIC</td>
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</tr>
<tr>
<td>BPU &amp; BPU0 ONE OF EACH</td>
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<tr>
<td>AUTOMATIC SOLID SHANK(ALLIANCE NO.2)</td>
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<td>ELECTRIC(BR)</td>
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<td>3.5</td>
<td>FLUORESCENT &amp; TUNGSTEN</td>
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<td>86</td>
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MOTOR BRAKE SECOND

CLASS 312/1

MBS

ED 213

66'2" (COUPLED)

66'6½" (UNCOUPLLED)

SEATS

TOILETS

COMPARTMENTS

GUARDS COMPARTMENTS

VENTILATION

CATERING EQUIPMENT

68

- - 1 - -

NS - NON SMOKING

NS - NON SMOKING

ORIGINAL DIAGRAMS FOR REFERENCE:

BR 491

ISSUE DATE

3 MAR 87

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**ED 213 OA**

**BRAKES**
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max. Speed M.P.H.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers

**BASIC TYPE**
Electro Pneumatic
BP14 & BP14a (One of Each)
Steel
Automatic Solid Shank (Alliance No.2)
Electric (BR)
90
3.5
Fluorescent & Tungsten
55.5
BR Standard MK 2
Not Fitted
Not Fitted

**ALTERNATIVES**

**TRACTION DATA FOR MULTIPLE UNITS**

EMU - Great Eastern Outer Suburban, Introduced 1975

Voltage 25 & 6.25 KV A.C. Overhead
Traction Motors 4 x 270 HP D.C. GEC

**VARIANTS**
None
**BRAKES**

**BOGIE/SUSPENSION**

**BODY CONSTRUCTION**

**COUPLINGS**

**TRAIN HEATING**

**MAX. SPEED M.P.H.**

**MIN. RAD. CURVE CHAINS**

**LIGHTING**

**TARE WEIGHT TONNES**

**GANGWAYS**

**TRAIN COMMUNICATION**

**BUFFERS**

**BASIC TYPE**

**ALTERNATIVES**

ELECTRO PNEUMATIC

BP14B & BP14C (ONE OF EACH)

STEEL

AUTOMATIC SOLID SHANK (ALLIANCE NO.2)

ELECTRIC (BR)

75

3.5

3.5

BUDD STANDARD MK 2

NOT FITTED

NOT FITTED

---

**TRACTION DATA FOR MULTIPLE UNITS**

EMU - LONDON MIDLAND OUTER SUBURBAN, INTRODUCED 1975

**VOLTAG**E 25 KV A.C. OVERHEAD

**TRACTION MOTORS** 4 X 270 HP D.C. GEC

---

**BASIC TYPE**

ED 214 DA

**VARIANTS**

NONE
ED 215

BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max Speed M.P.H.
Min Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers

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<thead>
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<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<td>54.5</td>
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</tr>
<tr>
<td>Not fitted</td>
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</table>

Traction Data for Multiple Units

EMU-

Euston-Birmingham-Manchester & Liverpool

Voltage 25 kV A.C. Overhead

Traction Motors 4 x 207 HP D.C. A.E.I.

Basic Type

ED 215 0A

Variants

None
ED 216

BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX.SPEED M.P.H.
MIN.RAD.CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
TRAIN COMMUNICATION
BUFFERS

**BASIC TYPE**

ELECTRO PNEUMATIC
GRESLEY ED5
STEEL
AUTOMATIC SOLID SHANK (ALLIANCE NO 2)
ELECTRIC (BR)
75
3.5
FLUORESCENT
55 (EST)
PULLMAN WITH RIGID (GRP) INNER PANELS
PUBLIC ADDRESS
CENTRE

**ALTERNATIVES**

GRESLEY ED6, GRESLEY ED2

---

**TRACTION DATA FOR MULTIPLE UNITS**


VOLTAGE
25 & 6.25 KV A.C. OVERHEAD

TRACTION MOTORS
CLASS 302 - 4 x 192 HP D.C. ENGLISH ELECTRIC.
CLASS 305/2 - 4 x 205 HP GEC.
CLASS 308/1 - 4 x 232 HP D.C. ENGLISH ELECTRIC.

---

**BASIC TYPE**

ED 216 0A-REFURBISHED

**VARIANTS**

1B CLASS 308/1 GRESLEY ED8 BOGIES.
2C CLASS 302 GRESLEY ED2 BOGIES.
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<td>Bogie/Suspension</td>
<td>GRESLEY ED2</td>
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<td>GANGWAYS</td>
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<td>TRAIN COMMUNICATION</td>
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</tr>
<tr>
<td>BUFFERS</td>
<td>NOT FITTED</td>
</tr>
</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**


- VOLTAGE: 25 & 6.25 KV A.C. OVERHEAD
- TRACTION MOTORS: 4 X 192 HP D.C. ENGLISH ELECTRIC.

**BASIC TYPE**

ED 217 OA - TEMPORARILY REFURBISHED

**VARIANTS**

NONE
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<td>BODY CONSTRUCTION</td>
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<td>COUPLINGS</td>
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<td>ELECTRIC (BR)</td>
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<td>MAX. SPEED M.P.H.</td>
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<td>FLUORESCENT</td>
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<td>GANGWAYS</td>
<td>PULLMAN</td>
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<td>TRAIN COMMUNICATION</td>
<td>PUBLIC ADDRESS</td>
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<td>BUFFERS</td>
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</table>

**Tracton Data for Multiple Units**


**Voltage**

25 & 6.25 KV A.C. OVERHEAD.

**Traction Motors**

4 x 282 HP D.C. GEC

**Basic Type**

ED 218 0A

**Variants**

NONE
ED 219

BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max. Speed M.P.H.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers

BASIC TYPE
Electro Pneumatic
84/Amo
Steel
Automatic Solid Shank (Buckeye)
Electric (BR)

75
3.5
Electric
57
Express Electric
Public Address with Transmitter
Not Fitted

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS
EMU-
Euston-Birmingham-Manchester & Liverpool

VOLTAGE 25 KV A.C. Overhead.
TRACTION MOTORS 4 x 270 HP D.C. English Electric

BASIC TYPE
ED 219 QA

VARIANTS
1B Refurbished & Reclassified Class 310/1
### BASIC TYPE

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<tr>
<th>ED 260 OA</th>
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### ALTERNATIVES

<table>
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<tr>
<th>S.R.MK 6 POWERED</th>
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</thead>
</table>

### Traction Data for Multiple Units

**EMU-**

**VOLTAGE**
- 750/850 VOLTS D.C.

**THIRD RAIL**
- 4 X 250 HP ENGLISH ELECTRIC

### Variants

18 S.R.MK 6 POWERED S.R.DESIGN REFERENCE CODE EA 1A.

28 S.R.MK 6 POWERED S.R.DESIGN REFERENCE CODE EA 2A.
BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX.SPEED H.P.H.
MIN.RAD CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
TRAIN COMMUNICATION
BUFFERS
S.R.DESIGN REFERENCE CODE

BASIC TYPE
ELECTRO PNEUMATIC
S.R.NK & POWERED & UNPOWERED (ONE OF EACH)
STEEL
AUTOMATIC SOLID SHANK (ALLIANCE NO.2)
ELECTRIC (GR)
20
5.5
TUNGSTEN
49
EXPRESS ELECTRIC
DRIVER/GUARD
NOT FITTED
EB

ALTERNATIVES
EB 1A

TRACTION DATA FOR MULTIPLE UNITS

EMU- INTRODUCED 1967.
VOLTAGE 750/650 VOLTS D.C. THIRD RAIL
TRACTION MOTORS 4 X 250 HP ENGLISH ELECTRIC

BASIC TYPE
ED 261 0A

VARIANTS
• 1A S.R.DESIGN REFERENCE CODE EB 1A.
ED 262

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<thead>
<tr>
<th>BRAKES</th>
<th>ELECTRO PNEUMATIC</th>
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<tbody>
<tr>
<td>BOGIE/SUSPENSION</td>
<td>S.R.MK 6 POWERED &amp; UNPOWERED (ONE OF EACH)</td>
</tr>
<tr>
<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
</tr>
<tr>
<td>COUPLINGS</td>
<td>AUTOMATIC SOLID SHANK (ALLIANCE NO.2)</td>
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<tr>
<td>TRAIN HEATING</td>
<td>ELECTRIC (OR)</td>
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<tr>
<td>MAX. SPEED N.P.H.</td>
<td>90</td>
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<td>MIN. RAD. CURVE CHAINS</td>
<td>3.5</td>
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<tr>
<td>LIGHTING</td>
<td>ELECTRIC</td>
</tr>
<tr>
<td>TARE WEIGHT TONNES</td>
<td>49</td>
</tr>
<tr>
<td>GANGWAYS</td>
<td>EXPRESS ELECTRIC</td>
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<tr>
<td>TRAIN COMMUNICATION</td>
<td>DRIVER/GUARD</td>
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<td>S.R.DESIGN REFERENCE CODE</td>
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TRACTION DATA FOR MULTIPLE UNITS


VOLTAGE 750/650 Volts D.C. Third Rail

TRACTION MOTORS 2 x 250 HP English Electric

BASIC TYPE

ED 262 0A

VARIANTS

NONE
BRKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max. Speed M.P.H.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers
S.R. Design Reference Code

BASIC TYPE
Electro Pneumatic
S.R. Mk 6 Powered & Unpowered (One of Each)
Steel
Automatic Solid Shank (Alliance No. 2)
Electric (GR)
90
3.5
Electric
49
Express Electric
Driver/Guard
Not Fitted
EB 1A

ALTERNATIVES
BP8-F

EB 2A, EB 3A, EB 4A, EB 5A, EB 6A

TRACTION DATA FOR MULTIPLE UNITS
EMU - Introduced 1967.
Voltage 750/850 Volts D.C. Third Rail
Traction Motors 4 x 250 HP English Electric

BASIC TYPE
ED 263 A

VARIANTS
1A S.R Design Reference Code EB 2A.
2A S.R Design Reference Code EB 3A.
4A S.R Design Reference Code EB 5A.
5A S.R Design Reference Code EB 6A.
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<tr>
<td>P7-3 (BREL)</td>
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<tr>
<td>STEEL</td>
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<tr>
<td>BAR</td>
<td></td>
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<tr>
<td>ELECTRIC(BR) FULL AIR CONDITIONING</td>
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<tr>
<td>100</td>
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<td>90</td>
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<td>FLUORESCENT</td>
<td></td>
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<tr>
<td>51</td>
<td></td>
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<tr>
<td>CENTRALLY SUPPORTED-SWIVELLING-FLEXIBLE DIAPHRAGM-STEEL FACE PLATE</td>
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<td>PUBLIC ADDRESS WITH TRANSMITTER</td>
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**TRACTION DATA FOR MULTIPLE UNITS**

EMU- WATERLOO-BOURNEMOUTH-WEMOUTH. INTRODUCED 1988

VOLTAGE 750 VOLTS D.C. THIRD RAIL

---

**BASIC TYPE**

ED 265 OA

**VARIANTS**

NONE
### Basic Type

<table>
<thead>
<tr>
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<th>ALTERNATIVES</th>
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<td>73-7 (BREL)</td>
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<td>STEEL</td>
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<tr>
<td>AUTOMATIC DROPHEAD BUCKEYE OUTER END</td>
<td>BAR INNER END</td>
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<td>ELECTRIC (BR) FULL AIR CONDITIONING</td>
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<td>100</td>
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<td>90</td>
<td></td>
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<td>FLUORESCENT</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td></td>
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<tr>
<td>CENTRALLY SUPPORTED-SWIVELLING-FLEXIBLE DIAPHRAGM-STEEL FACE PLATE DRIVER/SIGNAL BOX-DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER</td>
<td>RETRACTABLE SPINDLE- OUTER END ONLY</td>
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<tr>
<td>Fitted</td>
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### Traction Data for Multiple Units

EMU-WATERLOO-BOURNEMOUTH-WEMOUTH. INTRODUCED 1988

| VOLTAGE | 750 VOLTS.D.C. THIRD RAIL |

### Basic Type

EE 160 OA

### Variants

NONE
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<tr>
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<td>BOGIE/SUSPENSION</td>
<td>CLASS 503 TRAILER</td>
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<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
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<td>COUPLINGS</td>
<td>AUTOMATIC SOLID SHANK (ALLIANCE NO.2) OUTER END- PERMANENT SCREW</td>
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<td>TRAIN HEATING</td>
<td>INNER END</td>
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<td>MAX. SPEED M.P.H.</td>
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<td>LIGHTING</td>
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<td>TUNGSTEN</td>
</tr>
<tr>
<td>GANGWAYS</td>
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<tr>
<td>A.V.S.</td>
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</tr>
<tr>
<td>TRAIN COMMUNICATION</td>
<td>NOT FITTED</td>
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<tr>
<td>BUFFERS</td>
<td>SPINDLE-457 DIA.- INNER END ONLY</td>
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</tbody>
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TRACTION DATA FOR MULTIPLE UNITS

EMU- WIRRAL & MERSEY. INTRODUCED 1938 & 1956.

VOLTAGE 650 VOLTS D.C. THIRD RAIL

BASIC TYPE
EE 202 0A

VARIANTS
NONE
### BRKES
- ELECTRO PNEUMATIC CLASS 506 TRAILER
- STEEL SCREW ELECTRIC (BR)

### MAXIMUM SPEED MPH
- 70

### MINIMUM RADIUS CURVE CHAINS
- 3.5

### LIGHTING
- TUNGSTEN 28

### TARE WEIGHT TONNES
- NOT FITTED

### GANWAYS
- NOT FITTED

### A.V.S.
- NOT FITTED

### TRAIN COMMUNICATION
- SELF CONTAINED-559 OVAL

---

## Traction Data for Multiple Units

**EMU**
- MANCHESTER-GLOSSOP-HADFIELD
- INTRODUCED 1954

**Voltage**
- 1500 VOLTS D.C. OVERHEAD

---

### Basic Type
- EE 204 OA

### Variants
- NONE
BRAKES
Bogie/Suspension
Body Construction
Couplings

TRAIN HEATING
Max. Speed m.p.h.
Min. Radi. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
A.W.S.
Train Communication
Buffers

BASIC TYPE
Electro Pneumatic
Gresley ET2
Steel
Automatic Drophead (Buckle) Outer End - Automatic Solid Shank
(Alliance No. 2) Inner End
Electric (BR)
75
3.5
Tungsten
32.5
Not Fitted
Fitted
Not Fitted
Retractable Spindle - 559 X 356 Oval Outer End Only

ALTERNATIVES
04

TRACTION DATA FOR MULTIPLE UNITS
Voltage 25 & 6.25 KV A.C. Overhead

BASIC TYPE
EE 205 0A

VARIANTS
GB 84 Bogies.
BRAKES
Bogie/Suspension
Body Construction
Couplings

TRAIN HEATING
Max. Speed M.P.H.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
A.W.S.
Train Communication
Buffers

**TRACTION DATA FOR MULTIPLE UNITS**

EMU-
Glasgow Area.
Introduced 1960.

**VOLTAGE**
25 & 6.25 K.V. A.C. Overhead

**BASIC TYPE**
EE 206 OA

**VARIANTS**
None

**BASIC TYPE**
Electro Pneumatic
Gresley ETS
Steel
Automatic Drophead (Buckeye) Outer End-Automatic Solid Shank (Alliance No.2) Inner End
Electric (BR)
75
3.5
Electric
34.5
Not Fitted
Fitted
Not Fitted
Retractable Spindle-559 x 356 Oval Outer End Only

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(visit http://www.barrowmoremrg.co.uk)
DRIVING TRAILER SECOND

CLASS 502

SEATS 78
TOILETS
COMPARTMENTS
GUARDS COMPARTMENTS
VENTILATION
CATERING EQUIPMENT

ORIGINAL DIAGRAMS FOR REFERENCE:
LMS 593

ISSUE 2
DATE MAY 81

(visit http://www.barrowmoremrg.co.uk)
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<th>ALTERNATIVES</th>
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<td>BRACKES</td>
<td>ELECTRO PNEUMATIC</td>
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<td>BOGIE/SUSPENSION</td>
<td>CLASS 502 TRAILER</td>
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<td>BODY CONSTRUCTION</td>
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<td>A.V.S.</td>
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<td>BUFFERS</td>
<td>SELF CONTAINED-457 DIA.</td>
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**TRACTION DATA FOR MULTIPLE UNITS**

EMU - LIVERPOOL-SOUTHPORT. INTRODUCED 1939.

- VOLTAGE 650 VOLTS D.C. THIRD RAIL

**BASIC TYPE**

EE 207 0A

**VARIANTS**

NONE
**BRAKES**
- ELECTRO PNEUMATIC
- GRESLEY ET5
- STEEL
- AUTOMATIC DROPHEAD (BUCKEYE) OUTER END
- AUTOMATIC SOLID SHANK INNER END

**TRAIN HEATING**
- ALLIANCE NO. 2 INNER END
- ELECTRIC (BR)
- PUBLIC ADDRESS

- 75
- 3.5
- FLUORESCENT & TUNGSTEN

**TARE WEIGHT**
- 31.5

**TONNES**
- FITTED
   - NOT FITTED

**GANGWAYS**
- FITTED
   - NOT FITTED

**A.W.S.**
- RETRACTABLE SPINDLE 559 X 356 OVAL OUTER END ONLY

**TRACTION DATA FOR MULTIPLE UNITS**

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<tr>
<th></th>
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<td>VOLTAGE</td>
<td>25 &amp; 6.25 KV A.C. OVERHEAD</td>
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</tbody>
</table>

**BASIC TYPE**
- EE 209 0A

**VARIANTS**
- GB GRESLEY ET5 BOGIES,
- 1C PUBLIC ADDRESS,
- 1D GRESLEY ET5 BOGIES, PUBLIC ADDRESS
### Basic Type

<table>
<thead>
<tr>
<th>Basic Type</th>
<th>Alternatives</th>
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<tr>
<td>Bogie/Suspension</td>
<td>Gresley ETS</td>
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<tr>
<td>Body Construction</td>
<td>Steel</td>
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<tr>
<td>Couplings</td>
<td>Automatic Drophead (Buckeye) Outer End-Automatic Solid Shank (Alliance No. 2) Inner End</td>
</tr>
<tr>
<td>Train Heating</td>
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<tr>
<td>Max. Speed M.P.H.</td>
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<tr>
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<tr>
<td>Train Communication</td>
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### Traction Data for Multiple Units

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<th>GREAT EASTERN OUTER SUBURBAN. INTRODUCED 1960.</th>
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<tr>
<td>Voltage</td>
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### Basic Type

<table>
<thead>
<tr>
<th>Basic Type</th>
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</table>

### Variants

<p>| Variants | None      |</p>
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<thead>
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<th>ALTERNATIVES</th>
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<tr>
<td>ELECTRO PNEUMATIC</td>
<td>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-AUTOMATIC SOLID SHANK</td>
</tr>
<tr>
<td>GRESLEY E111</td>
<td>(ALLIANCE NO.2) INNER END</td>
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<tr>
<td>STEEL</td>
<td>ELECTRIC 3RD</td>
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**TRAINING DATA FOR MULTIPLE UNITS**

EMU-GLASGOW AREA, INTRODUCED 1967.

<table>
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<tr>
<th>VOLTAGE</th>
<th>25 &amp; 6.25 KV A.C. OVERHEAD</th>
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**VARIANTS**

NONE
DRIVING TRAILER SECOND

CLASS 504

DTS

EE 215

SEATS
94

TOILETS

COMPARTMENTS
5 PLUS 1 SALOON

GUARDS COMPARTMENTS

VENTILATION

CATERING EQUIPMENT

N.S. NON SMOKING.

8'-9" OVER DECKERS
12'-7" OVER TOPS
6'-41/2" TO TOP OF ROOF
6'-6" BOGE CR'S
8'-6" SHOE BEAM
46'-6" OVER HEADSTOCKS
63'-5" OVER HEADSTOCKS
1'-63 1/2" UNCOUPLED
1'-4" COUPLED

5'-6" OVER BODY
6'-4" OVER BODY
64'-0 1/8" OVER BODY
BRAKES
Bogie/Suspension
Body Construction
Couplings

TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
A.V.S.
TRAIN COMMUNICATION
BUFFERS

BASIC TYPE
EE 215

ALTERNATIVES
ELECTRO PNEUMATIC
CLASS 504 TRAILER
STEEL
AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-AUTOMATIC SOLID SHANK (ALLIANCE NO.2) INNER END
ELECTRIC (80)
45
3.5
TUNGSTEN
NOT FITTED
NOT FITTED
NOT FITTED
RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END ONLY

TRACTION DATA FOR MULTIPLE UNITS
EMU- MANCHESTER-BURY. INTRODUCED 1954.
VOLTAGE 1200 VOLTS D.C. THIRD RAIL

BASIC TYPE
EE 215 1A

VARIANTS
NONE
**BRAKES**

**BOGIE/SUSPENSION**

**BODY CONSTRUCTION**

**COUPLINGS**

**TRAIN HEATING**

**MAX SPEED M.P.H.**

**MIN. RAD. CURVE CHAINS**

**LIGHTING**

**TARE WEIGHT TONNES**

**GANGWAYS**

**A.W.S.**

**TRAIN COMMUNICATION**

**BUFFERS**

**BASIC TYPE**

**ALTERNATIVES**

**ELECTRO-PNEUMATIC**

**BT13a & BT13b (ONE OF EACH)**

**STEEL**

**AUTOMATIC TIGHTLOCK OUTER END-BAR INNER END**

**ELECTRIC (BP) WITH PRESSURE VENTILATION & HEATING**

**90**

**3.5**

**FLUORESCENT & TUNGSTEN**

**29.5**

**CENTRALLY SUPPORTED-SWIVELLING-FLEXIBLE DIAPHRAGM-STEEL FACE PLATE OUTER END-FLEXIBLE DIAPHRAGM/RIGID (GRP) INNER END FITTED**

**DRIVER/SIGNAL BOX-DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER NOT FITTED**

---

**TRACTION DATA FOR MULTIPLE UNITS**

EMU- ST.PANCras & MOorgate TO BEDford, TRANSFERRED TO E.R. OR W.C.M.L.

**VOLTAGE** 25 KV A.C. OVERHEAD

---

**BASIC TYPE**

**EE 216 0A**

**VARIANTS**

NONE
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRO-PNEUMATIC</td>
<td>STEEL</td>
</tr>
<tr>
<td>BT13d &amp; BT13e (ONE OF EACH)</td>
<td>TIGHTLOCK OUTER END-BAR INNER END</td>
</tr>
<tr>
<td>ELECTRIC (BR) WITH PRESSURE VENTILATION &amp; HEATING</td>
<td>FLUORESCENT</td>
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<tr>
<td>75</td>
<td>29.5</td>
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<td>3.5</td>
<td>CENTRALLY SUPPORTED-SWIVELLING-FLEXIBLE DIAPHRAGM-STEEL FACE</td>
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<tr>
<td>PLATE OUTER END-FLEXIBLE DIAPHRAGM/RIGID(GRP)INNER END</td>
<td>FITTED</td>
</tr>
<tr>
<td>DRIVER/SIGNAL BOX DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER</td>
<td>NOT FITTED</td>
</tr>
</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU**

**SOUTHERN REGION ROUTES, INTRODUCED 1982**

**VOLTAGE** 750 VOLTS D.C. THIRD RAIL

**BASIC TYPE**

EE 218 0A

**VARIANTS**

NONE
**BRAKES**

**BODY CONSTRUCTION**

**COUPLINGS**

**TRAIN HEATING**

**MAX. SPEED M.P.H.**

**MIN. RAD. CURVE CHAINS**

**LIGHTING**

**TARE WEIGHT TONNES**

**CABNWAYS**

**A.W.S.**

**TRAIN COMMUNICATION**

**BUFFERS**

---

**BASIC TYPE**

- ELECTRO PNEUMATIC
- GRESLEY ET2
- STEEL
- AUTOMATIC DROPHEAD (BUCKEYE) OUTER END AUTOMATIC SOLID SHANK
- (ALLIANCE NO 2) INNER END
- ELECTRIC (BR)
- 75
- 3.5
- FLUORESCENT
- 32.5 (EST)
- FULLMAN WITH RIGID (GRP) INNER PANELS INNER END ONLY
- FITTED
- DRIVER/GUARD-PUBLIC ADDRESS
- RETRACTABLE SPINDLE 559 x 356 OVAL OUTER END CENTRE INNER END

---

**ALTERNATIVES**

- B4, B5

---

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU -** GREAT EASTERN OUTER SUBURBAN. INTRODUCED 1958, REFURBISHED 1983.

**VOLTAGE** 25 & 6.25 KV A.C. OVERHEAD

---

**BASIC TYPE**

EE 219 DA-REFURBISHED

---

**VARIANTS**

- 0B B4 BOGIES.
- 0C B5 BOGIES.
### BASIC TYPE

- Electro Pneumatic
- Gresley ET5
- Steel
- Automatic Drophead (Buckeye) outer end
- Automatic Solid Shank
- (Alliance No 2) inner end
- Electric (BR)

### ALTERNATIVES

- Gresley ET8

### Traction Data for Multiple Units

**EMU**


- **VOLTAGE**: 25 & 6.25 kV A.C. Overhead

### BASIC TYPE

EE 220 0A - REFURBISHED

### VARIANTS

- 0B Class 308/1 Gresley ET8 Bogies

(visit http://www.barrowmoremrg.co.uk)
BRakes
Bogie/suspension
Body construction
Couplings
Train heating
Max.speed m.p.h.
Min.rad, curve chains
Lighting
Tare weight tonnes
Gangways
A.W.S.
Train communication
Buffers
S.R. Design reference code

BASIC TYPE
Electro pneumatic
S.R. Mk 4 unpowered
Steel
Automatic drophead (Buckeye) outer end-3 link outer end
Electric (BR)
90
3.5
Tungsten
32.5
Not fitted
Not fitted
Driver/guard
Retractable spindle-559 X 356 oval outer end-centre inner end
Dx

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS

EMU- introduced as class 414/2 1957, reclassed 1983.

Voltage 750/850 volts D.C. third rail

BASIC TYPE
EE 221 OA

VARIANTS
1A A.W.S. fitted.
**EE 222**

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAKES</td>
<td>ELECTRO PNEUMATIC</td>
</tr>
<tr>
<td>Bogie/Suspension</td>
<td>S.R.MK 4 UNPOWERED</td>
</tr>
<tr>
<td>Body Construction</td>
<td>STEEL</td>
</tr>
<tr>
<td>Couplings</td>
<td>AUTOMATIC DROPHEA(D)BUCKEYE)OUTER END-3 LINK INNER END</td>
</tr>
<tr>
<td>Train Heating</td>
<td>ELECTRIC(BR)</td>
</tr>
<tr>
<td>Max.Speed M.P.H.</td>
<td>90</td>
</tr>
<tr>
<td>Min.Rad.Curve Chains</td>
<td>3.5</td>
</tr>
<tr>
<td>Lighting</td>
<td>TUNGSTEN</td>
</tr>
<tr>
<td>Tare Weight Tonnes</td>
<td>32.5</td>
</tr>
<tr>
<td>Gangways</td>
<td>NOT FITTED</td>
</tr>
<tr>
<td>A.W.S.</td>
<td>NOT FITTED</td>
</tr>
<tr>
<td>Train Communication</td>
<td>FITTED</td>
</tr>
<tr>
<td>Buffers</td>
<td>DRIVER/GUARD</td>
</tr>
<tr>
<td>S.R. Design Reference Code</td>
<td>RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END-CENTRE INNER END</td>
</tr>
<tr>
<td>DZ</td>
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**Traction Data for Multiple Units**

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<th></th>
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</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>750/850 Volts D.C. THIRD RAIL</td>
</tr>
</tbody>
</table>

**BASIC TYPE**

EE 222 0A

**VARIANTS**

1A A.W.S. FITTED.
DRIVING TRAILER SECOND

CLASS 302

DTS

EE 223

1295

14173 BOGIE CENTRES

19329 OVER HEADSTOCKS

20358 OVER BUFFERS WHEN EXTENDED

3772 OVER ROOF

3835 OVER VENTS

2743 OVER BODY & STEPBOARDS

2819 OVERALL

1283

821

19495 OVER END PANELS

SEATS
92

TOILETS
-

COMPARTMENTS
-

GUARDS COMPARTMENTS
-

VENTILATION
-

CATERING EQUIPMENT
-

ISSUE 1
DATE AUG '83

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### Basic Type

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<thead>
<tr>
<th>BRakes</th>
<th>Electro Pneumatic</th>
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</thead>
<tbody>
<tr>
<td>Bogie/Suspension</td>
<td>Gresley Et2</td>
</tr>
<tr>
<td>Body Construction</td>
<td>Steel</td>
</tr>
<tr>
<td>Couplings</td>
<td>Automatic Drophead (Buckeye) OUTER END-Automatic Solid Shank</td>
</tr>
<tr>
<td>Train Heating</td>
<td>(Alliance No 2) Inner End</td>
</tr>
<tr>
<td>MAX SPEED M.P.H.</td>
<td>Electric (BR)</td>
</tr>
<tr>
<td>MIN, RAD. Curve Chains</td>
<td>75</td>
</tr>
<tr>
<td>Lighting</td>
<td>3.5</td>
</tr>
<tr>
<td>Tare Weight Tonnes</td>
<td>Tungsten</td>
</tr>
<tr>
<td>Gangways</td>
<td>32.5</td>
</tr>
<tr>
<td>A.W.S.</td>
<td>Not Fitted</td>
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<tr>
<td>Train Communication</td>
<td>Fitted</td>
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<tr>
<td>Buffers</td>
<td>Not Fitted</td>
</tr>
<tr>
<td>Retractable Spindle-559 x 356 Oval Outer End-Centre Inner End</td>
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</tr>
</tbody>
</table>

### Traction Data for Multiple Units


- Voltage: 25 & 6.25 KV A.C. Overhead

### Basic Type

EE 223 OA-Temporarily Refurbished

### Variants

None
BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max. Speed M.P.H.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
A.W.S.
Train Communication
Buffers

**Basic Type**

- Electo-pneumatic
- BT13a & BT13b (One of Each)
- Steel
- Automatic Tightlock Outer End-Bar Inner End
- Electric (BR)

**Alternatives**

- 3.5 Fluorescent & Tungsten
- 25.5 Centrally Supported-Swivelling-Flexible Diaphragm-Steel Face Plate Outer End-Flexible Diaphragm/Rigid (GRP) Inner End Fitted
- Driver/Signal Box-Driver/Guard-Public Address with Transmitter Not Fitted

**Traction Data for Multiple Units**

EMU-

Great Northern Outer Suburban

- Voltage
- 25 kV A.C. Overhead

**Basic Type**

EE 224 0A

**Variants**

None
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tbody>
<tr>
<td>ELECTRO-PNEUMATIC</td>
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<tr>
<td>BT13 &amp; BT13b(TWO OF EACH)</td>
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<tr>
<td>STEEL</td>
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<tr>
<td>AUTOMATIC TIGHTLOCK OUTER END-BAR INNER END</td>
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<tr>
<td>ELECTRIC(BR)</td>
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<tr>
<td>90</td>
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<td>3.5</td>
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<tr>
<td>FLUORESCENT &amp; TUNGSTEN</td>
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<tr>
<td>25-5</td>
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<tr>
<td>OUTER END-FLEXIBLE DIAPHRAGM/RIGID(GRP) INNER END</td>
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<td>FITTED</td>
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<tr>
<td>DRIVER/SIGNAL BOX-DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER</td>
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</tr>
<tr>
<td>NOT FITTED</td>
<td></td>
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</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**

| EMU- GREAT NORTHERN OUTER SUBURBAN | |
| VOLTAGE 25 KV A.C.OVERHEAD | |

**BASIC TYPE**

EE 225 0A

**VARIANTS**

NONE
BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS

A.W.S.
TRAIN COMMUNICATION
BUFFERS

#### BASIC TYPE
- ELECTRO-PNEUMATIC
- BT13d & BT13e (ONE OF EACH)
- STEEL
- TIGHTLOCK OUTER END-BAR INNER END
- ELECTRIC (BR)
- 75
- 3.5
- FLUORESCENT
- 29.5
- CENTRALLY SUPPORTED-SWIVELLING-FLEXIBLE DIAPHRAGM-STEEL FACE PLATE
- OUTER END-FLEXIBLE DIAPHRAGM/RIGID (GRP) INNER END
- FITTED
- DRIVER/SIGNAL BOX-DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER
- NOT FITTED

#### ALTERNATIVES

### TRACTION DATA FOR MULTIPLE UNITS
- EMU
  - SOUTHERN REGION ROUTES, INTRODUCED 1985
  - VOLTAGE
  - 750 VOLTS D.C. THIRD RAIL

### BASIC TYPE
- EE 226 OA

### VARIANTS
- NONE
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tbody>
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<td>ELECTRO-PNEUMATIC</td>
<td>BT130 &amp; BT132 (ONE OF EACH)</td>
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<tr>
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<td>AUTOMATIC TIGHTLOCK OUTER END-BAR INNER END</td>
</tr>
<tr>
<td>ELECTRIC (BR)</td>
<td>30</td>
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<td>3.5</td>
<td>FLUORESCENT &amp; TUNGSTEN</td>
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<td>CENTRALLY SUPPORTED-SWIVELING-FLEXIBLE DIAPHRAGM-STEEL FACE PLATE</td>
<td>OUTER END-FLEXIBLE DIAPHRAGM/RIGID (GRP) INNER END</td>
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<tr>
<td>Fitted</td>
<td>DRIVER/ SIGNAL BOX- DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER</td>
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<tr>
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**Traction Data for Multiple Units**

<table>
<thead>
<tr>
<th>EMU</th>
<th>GLASGOW AREA</th>
</tr>
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<tbody>
<tr>
<td>VOLTAGE</td>
<td>25 KV A.C. OVERHEAD</td>
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<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>VARIANTS</th>
</tr>
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<tbody>
<tr>
<td>EE 227 OA</td>
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</table>
BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX.SPEED M.P.H.
MIN.RAD, CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
A.W.S.
TRAIN COMMUNICATION
BUFFERS

**BASIC TYPE**

- ELECTRO-PNEUMATIC
- BT130 & BT13D (ONE OF EACH)
- STEEL
- AUTOMATIC TIGHTLOCK OUTER END-BAR INNER END
- ELECTRIC (BR)
- 90
- 3.5
- FLUORESCENT & TUNGSTEN
- 29.6
- CENTRALLY SUPPORTED-SWIVELLING-FLEXIBLE DIAPHRAGM-STEEL FACE PLATE
- OUTER END-FLEXIBLE DIAPHRAGM/RIGID (GRP) INNER END
- FITTED
- DRIVER/SIGNAL BOX-DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER
- NOT FITTED

**ALTERNATIVES**

**TRACTION DATA FOR MULTIPLE UNITS**

EMU- GLASGOW AREA

VOLTAGE 25 KV A.C. OVERHEAD

---

**BASIC TYPE**

EE 228 OA

**VARIANTS**

NONE
### BASIC TYPE

| ELECTRO PNEUMATIC COMMONWEALTH |
| STEEL |
| AUTOMATIC DROPHEAD (BUCKEYE) OUTER END |
| AUTOMATIC SOLID SHANK (ALLIANCE No. 2) INNER END |
| ELECTRIC (BR) 100 |
| 3.5 |
| FLUORESCENT & TUNGSTEN 32 |
| PULLMAN PUBLIC ADDRESS |
| RETRACTABLE SPINDLE - 559 x 356 OVAL - OUTER END ONLY |

### ALTERNATIVES

### Traction Data for Multiple Units

| VOLTAGE 25 & 6.25 KV A.C. OVERHEAD. |

### BASIC TYPE

EE 229 QA

### VARIANTS

NONE
**BRAKES**
- ELECTRO-PNEUMATIC
- BTL3a & BTL3b (ONE OF EACH)

**BOGIE/SUSPENSION**
- STEEL

**BODY CONSTRUCTION**
- AUTOMATIC TIGHTLOCK OUTER END-BAR INNER END
- ELECTRIC (BR) WITH PRESSURE VENTILATION & HEATING

**COUPLINGS**
- 90

**TRAIN HEATING**
- 5.5

**MAX. SPEED M.P.H.**
- FLUORESCENT & TUNGSTEN

**MIN. RAD. CURVE CHAINS**
- 29.5

**LIGHTING**
- CENTRALLY SUPPORTED-SWIVELLING-FLEXIBLE DIAPHRAGM-STEEL FACE PLATE

**TARE WEIGHT TONNES**
- OUTER END-FLEXIBLE DIAPHRAGM/RIGID (GRP) INNER END

**GANWAYS**
- FITTED

**A.W.S.**
- DRIVER/SIGNAL BOX-DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER

**TRAIN COMMUNICATION**
- NOT FITTED

**BUFFERS**

---

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU-**
- ST. PANCRAS & MOORGATE TO BEDFORD. TRANSFERED TO GREAT NORTHERN SUBURBAN 1986

**VOLTAGE**
- 25 KV A.C. OVERHEAD

---

**BASIC TYPE**

**EE 232 OA**

**VARIANTS**

**NONE**
### Basic Type

<table>
<thead>
<tr>
<th>Brakes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electro-Pneumatic</td>
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<tr>
<td>T3-7a &amp; T3-7b (one of each)</td>
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<table>
<thead>
<tr>
<th>Alternatives</th>
</tr>
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<tbody>
<tr>
<td>Steel</td>
</tr>
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<td>Automatic Tightlock Outer End-Bar Inner End</td>
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<td>Electric (ER)</td>
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<table>
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<th>Max. Speed (M.P.H)</th>
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<table>
<thead>
<tr>
<th>Min. Rad. Curve (Chains)</th>
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<tbody>
<tr>
<td>3.5</td>
</tr>
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<table>
<thead>
<tr>
<th>Lighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluorescent</td>
</tr>
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<td>28.2</td>
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<table>
<thead>
<tr>
<th>Tare Weight (Tonnes)</th>
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<tr>
<td>Flexible Diaphragm/Rigid (GRP) Inner End</td>
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<table>
<thead>
<tr>
<th>Gangways</th>
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<tbody>
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<table>
<thead>
<tr>
<th>A.W.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fitted</td>
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<table>
<thead>
<tr>
<th>Train Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver/Signal Box-Driver/Guard/Public Address with Transmitter</td>
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<table>
<thead>
<tr>
<th>Buffers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not fitted</td>
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### Traction Data for Multiple Units

**EMU-** Cross London Services, introduced 1987

<table>
<thead>
<tr>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 kV A.C. Overhead &amp; 750V D.C. Third Rail</td>
</tr>
</tbody>
</table>

---

### Basic Type

EE 233 OA

### Variants

None
BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX.SPEED M.P.H.
MIN.RAD.CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
A.W.S.
TRAIN COMMUNICATION
BUFFERS

BASIC TYPE
EE 234 DA

ALTERNATIVES
ELECTRO-PNEUMATIC
T3-70 & T3-70 (ONE OF EACH)
STEEL
AUTOMATIC TIGHTLOCK OUTER END-BAR INNER END
ELECTRIC (BR)
3.5
FLUORESCENT
28.1
FLEXIBLE DIAPHRAGM/RIGID (GRP) INNER END
FITTED
DRIVER/SIGNAL BOX-DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER
NOT FITTED

TRACTION DATA FOR MULTIPLE UNITS
EMU- CROSS LONDON SERVICES. INTRODUCED 1987
VOLTAGE 25 KV A.C.OVERHEAD & 750V D.C.THIRD RAIL

VARIANTS
NONE
DRIVING TRAILER SECOND

CLASS 317/1

DTS(B)  EE 235

14170 BOGIE CENTRES
19330 OVER HEADSTOCKS
20130 COUPLED
20524 UNCOUPLED
19830 OVER BODY

5460 1280 5700 1280 3500 770 1440

370 28 SEATS  28 SEATS  14 SEATS
NO SMOKING  NO SMOKING  NO SMOKING

1010 THROUGHWAY  1010 THROUGHWAY

LOCKABLE SLIDING DOOR (BR 1 KEY)
INVALID / LUGGAGE AREA
14 TIP-UP SEATS

SEATS  TOILETS  COMPARTMENTS  GUARDS COMPARTMENTS  VENTILATION  CATERING EQUIPMENT
70 - - - -

ORIGIAL DIAGRAMS FOR REFERENCE:
BR 463

ISSUE DATE
1 APR 86

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(visit http://www.barrowmoremrg.co.uk)
### Basic Type

<table>
<thead>
<tr>
<th>Brakes</th>
<th>Electro-Pneumatic</th>
</tr>
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<tbody>
<tr>
<td>Bogie/Suspension</td>
<td>BTi3b &amp; BTi3b (one of each)</td>
</tr>
<tr>
<td>Body Construction</td>
<td>Steel</td>
</tr>
<tr>
<td>Couplings</td>
<td>Automatic Tightlock Outer End-Bar, Inner End</td>
</tr>
<tr>
<td>Train Heating</td>
<td>Electric (Br) with Pressure Ventilation &amp; Heating</td>
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<tr>
<td>Max. Speed M.P.H.</td>
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</tr>
<tr>
<td>Min. Rad. Curve Chains</td>
<td>3.5</td>
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<tr>
<td>Lighting</td>
<td>Fluorescent &amp; Tungsten</td>
</tr>
<tr>
<td>Tare Weight Tonnes</td>
<td>29.5</td>
</tr>
<tr>
<td>Gangways</td>
<td>Centrally Supported-Swivelling-Flexible Diaphragm-Steel Face Plate</td>
</tr>
<tr>
<td>A.W.S.</td>
<td>Fitted</td>
</tr>
<tr>
<td>Train Communication</td>
<td>Driver/Signal Box-Driver/Guard-Public Address with Transmitter</td>
</tr>
<tr>
<td>Buffers</td>
<td>Not Fitted</td>
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### Alternatives

<table>
<thead>
<tr>
<th>Traction Data for Multiple Units</th>
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<tbody>
<tr>
<td>Voltage</td>
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### Basic Type

<table>
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<tr>
<td>EE 235 OA</td>
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### Variants

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</table>
BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE METRES
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
A.W.S.
TRAIN COMMUNICATION
BUFFERS

BASIC TYPE

ELECTRO-PNEUMATIC
T3-71 & T3-7J (ONE OF EACH)
STEEL
AUTOMATIC TIGHTLOCK OUTER END-BAR INNER END
ELECTRIC (BR)
100
71
FLUORESCENT
29.1
FLEXIBLE DIAPHRAGM/RIGID (GRP) INNER END
FITTED
DRIVER/GUARD PUBLIC ADDRESS WITH TRANSMITTER
NOT FITTED

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS

EMU- ANGLIA-ELECTRICS INTRODUCED 1988/89

VOLTAGE 25 KV A.C. OVERHEAD

BASIC TYPE

EE 236 DA

VARIANTS

NONE
<table>
<thead>
<tr>
<th><strong>BRAKES</strong></th>
<th><strong>ALTERNATIVES</strong></th>
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<td>ELECTRO PNEUMATIC</td>
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<tr>
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<td>B4/AMID DT</td>
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<tr>
<td>COUPLINGS</td>
<td>STEEL</td>
</tr>
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<td>TRAIN HEATING</td>
<td>AUTOMATIC DROP HEAD (BUCKEYE) OUTER END</td>
</tr>
<tr>
<td>MAX.SPEED M.P.H.</td>
<td>AUTOMATIC SOLID SHANK</td>
</tr>
<tr>
<td>MIN.RAD CURVE CHAINS</td>
<td>(BUCKEYE) INNER END</td>
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<tr>
<td>LIGHTING</td>
<td>ELECTRIC (BR)</td>
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<tr>
<td>TARE WEIGHT TONNES</td>
<td>75</td>
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<tr>
<td>GANGWAYS</td>
<td>3.5</td>
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<tr>
<td>TRAIN COMMUNICATION</td>
<td>TUNGSTEN</td>
</tr>
<tr>
<td>BUFFERS</td>
<td>EXPRESS ELECTRIC INNER END ONLY</td>
</tr>
</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU-**


**VOLTAGE**

25 KV A.C. OVERHEAD.

---

[**BASIC TYPE**]

EE 237 0A

[**VARIANTS**]

NONE
BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max. Speed M.P.H.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
A.V.S.
Train Communication
Buffers
S.R. Design Reference Code

BASIC TYPE

ALTERNATIVES

Electro Pneumatic
Ex. London Transport
Steel Underframe, Body & Roof, Wooden Body Framing
Ex. London Transport
Electric (BR)
No Record
3.5
Electric
17
Not Fitted
Not Fitted
Driver/Guard
Not Fitted
DAE

TRACTION DATA FOR MULTIPLE UNITS

EMU
Isle of Wight
Introduced 1967 - Ex. London Transport Stock

VOLTAGE
630 Volts D.C. Third Rail

BASIC TYPE
EE 260 OA

VARIANTS
None
DRIVING TRAILER SECOND

CLASS 416/2

DTS

EE 264

1295 1295

14173 BOGIE CENTRES

19329 OVER HEADSTOCKS

20438 OVER BUFFERS WHEN EXTENDED

89

3772

1981

OVER STEPBOARDS
2743

OVER BODY & STEPBOARDS
2824

OVERALL

3861

1203 813 1908 1918 1910 1908 1899 1899 1899 1899 1899 1899

19495 OVER BODY

SEATS 102
TOILETS -
COMPARTMENTS 5 PLUS 1 SALOON
GUARDS COMPARTMENTS -
VENTILATION -
CATERING EQUIPMENT -

NS - NON SMOKING

ORIGINAL DIAGRAMS FOR REFERENCE:
BR 420

ISSUE 3 NOV’84

(visit http://www.barrowmoremrg.co.uk)
**TRACTION DATA FOR MULTIPLE UNITS**

**EMU**
INTRODUCED 1954

**VOLTAGE**
750/850 VOLTS D.C. THIRD RAIL

---

**BASIC TYPE**

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tbody>
<tr>
<td>ELECTRO PNEUMATIC</td>
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<tr>
<td>S.R.MK 3D UNPOWERED</td>
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<td>STEEL</td>
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<tr>
<td>AUTOMATIC DROPHEADD(BUCKEYE) OUTER END-3 LINK INNER END</td>
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<tr>
<td>ELECTRIC(BR)</td>
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<tr>
<td>TUNGSTEN</td>
<td></td>
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<td>30.5</td>
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<td>NOT FITTED</td>
<td></td>
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<tr>
<td>NOT FITTED</td>
<td></td>
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<tr>
<td>DRIVER/GUARD</td>
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<tr>
<td>RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END-CENTRE INNER END DV</td>
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<tr>
<td>32.5</td>
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<tr>
<td>FITTED</td>
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**BASIC TYPE**

EE 264 OA

**VARIANTS**

1A A.W.S. FITTED, TARE 32.5.
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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</thead>
<tbody>
<tr>
<td>ELECTRO PNEUMATIC</td>
<td>FC 1A</td>
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<td>BS(S.R.)</td>
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<td>STEEL</td>
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<tr>
<td>AUTOMATIC DROPHEAD (BUCKEYE)</td>
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<tr>
<td>OUTER END</td>
<td></td>
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<tr>
<td>AUTOMATIC SOLID SHANK (ALLIANCE NO. 2)</td>
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<tr>
<td>INNER END</td>
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</tr>
<tr>
<td>ELECTRIC (BR)</td>
<td></td>
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<tr>
<td>90</td>
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<td>TUNGSTEN</td>
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<tr>
<td>3.5</td>
<td></td>
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<tr>
<td>EXPRESS ELECTRIC</td>
<td></td>
</tr>
<tr>
<td>FITTED</td>
<td></td>
</tr>
<tr>
<td>DRIVER/GUARD</td>
<td></td>
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<tr>
<td>RETRACTABLE SPINDLE 559 X 356 OVAL OUTER END ONLY</td>
<td></td>
</tr>
<tr>
<td>FC</td>
<td></td>
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</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**


**BASIC TYPE**

EE 266 OA

**VARIANTS**

1A S.R. DESIGN REFERENCE CODE FC 1A.

2B MODIFIED INTERIOR & LIGHTS.
DRIVING TRAILER SECOND

CLASS 416/3

DTS

EE 269

13411 BOGIE CENTRES
18895 OVER UNDERFRAME

18050 OVER BODY

SEATS 92
TOILETS -
COMPARTMENTS -
GUARDS COMPARTMENTS -
VENTILATION -
CATERING EQUIPMENT -

29 1876 1886 1886 1886 1886 1886 1886 1876 846 1283

32 107

DRIVER

208 2743

3772

162

29

1876 1886 1886 1886 1886 1886 1886 1876 646 1283

32 107

DRIVER

208 2743

3772

162

29

1876 1886 1886 1886 1886 1886 1886 1876 646 1283

32 107

DRIVER

208 2743

3772

162

29

1876 1886 1886 1886 1886 1886 1886 1876 646 1283

32 107

DRIVER

208 2743

3772

162

29

1876 1886 1886 1886 1886 1886 1886 1876 646 1283

32 107

DRIVER

208 2743

3772

162

29

1876 1886 1886 1886 1886 1886 1886 1876 646 1283

32 107

DRIVER

208 2743

3772

162

29

1876 1886 1886 1886 1886 1886 1886 1876 646 1283

32 107

DRIVER

208 2743

3772

162

29

1876 1886 1886 1886 1886 1886 1886 1876 646 1283

32 107

DRIVER

208 2743

3772

162

29

1876 1886 1886 1886 1886 1886 1886 1876 646 1283

32 107

DRIVER

208 2743

3772

162

29

1876 1886 1886 1886 1886 1886 1886 1876 646 1283

32 107

DRIVER

208 2743

3772

162

29

1876 1886 1886 1886 1886 1886 1886 1876 646 1283

32 107

DRIVER

208 2743

3772

162

29

1876 1886 1886 1886 1886 1886 1886 1876 646 1283

32 107

DRIVER

208 2743

3772

162

29
TRACTION DATA FOR MULTIPLE UNITS


VOLTAGE 750/850 VOLTS D.C. THIRD RAIL
BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
A.W.S.
TRAIN COMMUNICATION
BUFFERS
S.R. DESIGN REFERENCE CODE

BASIC TYPE

ALTERNATIVES

ELECTRO PNEUMATIC
SR MK 3D UNPOWERED
STEEL
AUTOMATIC DROPCUE HEAD (BUCKEYE) OUTER END - 3 LINK INNER END
ELECTRIC (BR)
75
3.5
FLUORESCENT & TUNGSTEN
30.5
NOT FITTED
FITTED
DRIVER GUARD & PUBLIC ADDRESS
RETRACTABLE SPINDLE - 559x356 - OUTER END - CENTRE INNER END
DAM 1A

TRACTION DATA FOR MULTIPLE UNITS

EMU-
INTRODUCED 1954, REFURBISHED 1980/81

VOLTAGE
750/850 VOLTS D.C. THIRD RAIL

BASIC TYPE

EE 271 0A

VARIANTS

NONE
DRIVING TRAILER STANDARD

CLASS 442

DTS

EE 273

23000 OVER GANWAY (COUPLED)

3075
1040
3075
26000 BOGIE CENTRES
22150 OVER HEADSTOCKS

3810 OVER CORRUGATIONS

2740 AT WAIST

22570 OVER BODY END DATUM

1160 1415
17295 BETWEEN PARTITIONS

1620
18250 BETWEEN PARTITIONS

SEATS 78
TOILETS 1
COMPARTMENTS -
GUARDS COMPARTMENTS -
VENTILATION - FULL AIR CONDITIONING
CATERING EQUIPMENT -

ISSUE DATE
1 JUL 88
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tbody>
<tr>
<td>Electro-pneumatic</td>
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<tr>
<td>T3-T (BREL)</td>
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<tr>
<td>Steel</td>
<td>T3-T (BREL)</td>
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<tr>
<td>Automatic Drophead Buckeye Outer End-Bar Inner End</td>
<td>Steel</td>
</tr>
<tr>
<td>Electric (BR) Full Air Conditioning</td>
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</tr>
<tr>
<td>100</td>
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<tr>
<td>90</td>
<td>Fluorescent &amp; Tungsten</td>
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<td>34</td>
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<td>Centrally Supported-Swivelling-Flexible Diaphragm-Steel Face Plate</td>
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<tr>
<td>Driver/Signal Box-Driver/Guard-Public Address with Transmitter</td>
<td></td>
</tr>
<tr>
<td>Retractable Spindle- Outer End Only</td>
<td></td>
</tr>
</tbody>
</table>

**Traction Data for Multiple Units**

EMU - Waterloo-Bournemouth-Weymouth. Introduced 1988

Voltage 750 Volts, D.C. Third Rail

**Basic Type**

EE 273 OA

**Variants**

None
DRIVING TRAILER STANDARD

CLASS 416/4

DTS

EE 274

14173 BOGIE CENTRES

19329 OVER HEADSTOCKS

20438 OVER BUFFERS WHEN EXTENDED

19495 OVER BODY

SEATS 90
TOILETS -
COMPARTMENTS -
GUARDS COMPARTMENTS -
VENTILATION -
CATERING EQUIPMENT -

ISSUE 1
DATE OCT '86

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<table>
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<tr>
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<th>ALTERNATIVES</th>
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<tbody>
<tr>
<td>ELECTRO PNEUMATIC</td>
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<tr>
<td>S.R.WK 3D UNPOWERED STEEL</td>
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<td>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-3 LINK INNER END ELECTRIC (BR) 75</td>
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<td>3.5 FLUORESCENT &amp; TUNGSTEN</td>
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<td>30.5</td>
<td>NOT FITTED</td>
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<td>NOT FITTED</td>
<td>FITTED</td>
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<tr>
<td>DRIVER/GUARD &amp; PUBLIC ADDRESS</td>
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<tr>
<td>RETRACTABLE SPINDLE 559 X 356 OVAL OUTER END-CENTRE INNER END DAM 3B</td>
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</tr>
</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU**

- INTRODUCED 1954 REFURBISHED 1960/1 CONVERTED TO REVENUE PROTECTED UNITS 1986

**VOLTAGE**

- 750/650 VOLTS D.C. THIRD RAIL

**BASIC TYPE**

EE 274 OA

**VARIANTS**

1B A.W.S. FITTED, TARE 32.5, EX TYNESIDE VEHICLE.
EE 305

**BRAKES**
- Boogie/suspension
- Body construction
- Couplings

**TRAIN HEATING**
- Max. speed M.P.H.
- Min. radii curve chains
- Lighting
- Tare weight tonnes
- Gangways
- A.W.S.
- Train communication
- Buffers
- Voltage equipment
- Smoking accommodation

**BASIC TYPE**
- Electro pneumatic
- BTB & BT8e one of each
- Steel
- Automatic drophead (buckeye) outer end, automatic solid shank
- (Alliance No. 2) inner end
- Electric (BR)
- Class 312/0 & 312/1 90, Class 312/2 75
- 3.5
- Fluorescent & tungsten
- 33
- BR Standard MK 2
- Fitted
- Not fitted
- Retractable spindle-559 X 356-outer end only
- 25 KV A.C.
- Areas A & B non smoking

**ALTERNATIVES**
- 25 & 6.25 KV A.C.
- Area A smoking

**TRACTION DATA FOR MULTIPLE UNITS**
- EMU-
  - Class 312/0 great northern outer suburban - Class 312/1 great eastern outer suburban - Class 312/2 London midland outer suburban introduced 1975.
  - Voltage
    - 25 KV A.C. overhead or 25 & 6.25 KV A.C. overhead - see variants

**BASIC TYPE**
- EE 305 1B - Class 312/0

**VARIANTS**
- 1C Class 312/2, Area A smoking, Area B non smoking.
- 2B Class 312/1, Voltage equipment 25 & 6.25 KV A.C, Area A non smoking, Area B non smoking.
- 1D Class 312/0 facelifted.
BRAKES
Bogie/Suspension
Body Construction
Couplings

Train Heating
Max.Speed M.P.H.
Min.Rad.Curve Chains
Lighting
Tare Weight Tonnes
Gandways
A.S.S.
Train Communication
Buffers

BASIC TYPE
Electro Pneumatic
B4/AMD DT
Steel
Automatic Drophead (Buckeye) Outer End - Automatic Solid Shank (Buckeye)

INNER END
Electric (BR)
75
3.5
Tungsten
34.5
Express Electric Inner End Only
Fitted
Not Fitted
Retractable Spindle (559x356 Oval) Outer End Only

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS


VOLTAGE 25 KV A.C. Overhead

BASIC TYPE
EE 306 OA

VARIANTS
1B Facelifted, Public Address Fitted.
DRIVING TRAILER COMPOSITE

CLASS 307

DTC

EE 307

559 1295

14173 BOGIE CENTRES

19329 OVER HEADSTOCKS

1295

3772 OVER ROOF

3835 OVER VENTS

3961 OVERALL

2743

OVER BODY & STEPBOARDS 2824

OVERALL

1911 1908 1918 1918 1918 1908

24 FIRST CLASS, 52 SECOND CLASS

SEATS
TOILETS
COMPARTMENTS
GUARDS COMPARTMENTS
VENTILATION
CATERING EQUIPMENT

19495 OVER BODY

1283 821 1892 1892 1892 1892

1902 1902 1902

ISSUE DATE
2 MAR 87

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<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tbody>
<tr>
<td>ELECTRO PNEUMATIC</td>
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<td>STEEL</td>
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<tr>
<td>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END - AUTOMATIC SOLID SHANK (BUCKEYE) INNER END</td>
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<tr>
<td>ELECTRIC (BR)</td>
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<td>75</td>
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<td>FLUORESCENT</td>
<td></td>
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<tr>
<td>33</td>
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<td>PULLMAN WITH RIGID (GRP) INNER PANELS INNER END ONLY</td>
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<td>FITTED</td>
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<tr>
<td>DRIVER/GUARD-PUBLIC ADDRESS</td>
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</tr>
<tr>
<td>RETRACTABLE SPINDLE 559 X 356 OVAL OUTER END - CENTRE INNER END</td>
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</tr>
</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**


25 & 6.25 KV A.C. OVERHEAD

**BASIC TYPE**

EE 307 DA

**VARIANTS**

0B B4 BOGIES.
BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max Speed M.P.H.
Min Radius Curve Metres
Lighting
Tare Weight Tonnes
Gangways
A.W.S.
Train Communication
Buffers

BASIC TYPE
- ELECTRO-PNEUMATIC
  T3-TJ & T3-TK (ONE OF EACH)
  STEEL
  AUTOMATIC TIGHTLOCK OUTER END-BAR INNER END
  ELECTRIC (BR)
  100
  71
  FLUORESCENT
  29.3
  FLEXIBLE DIAPHRAGM/GRIP (GRP) INNER END
  FITTED (BR/DUAL)
  DRIVER/GUARD PUBLIC ADDRESS WITH TRANSMITTER
  NOT FITTED

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS
EMU
- ANGLIA-ELECTRICS INTRODUCED 1988/89

VOLTAGE
25 KV A.C. OVERHEAD

BASIC TYPE
EE 308 0A

VARIANTS
NONE
DRIVING TRAILER COMPOSITE

CLASS 414/2
CLASS 413/2

DTC

EE 361

14173 BOGIE CENTRES
1295 1295
19329 OVER HEADSTOCKS
1295 1295
20438 OVER BUFFERS WHEN EXTENDED

3772

2591
OVER STEPBOARDS
2743
OVER BODY & STEPBOARDS
2819
OVERALL

19495 OVER BODY

ON SOME VEHICLES THIS SALOON IS NON SMOKING

SEATS
19 FIRST CLASS 50 SECOND CLASS

TOILETS
2

COMPARTMENTS
3 FIRST CLASS PLUS 1 SECOND CLASS SALOON

GUARDS COMPARTMENTS
-

VENTILATION
-

CATERING EQUIPMENT
-

ORIGINAL DIAGRAMS FOR REFERENCE:-
BR 441

ISSUE DATE
4 AUG 85

NS - NON SMOKING

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<table>
<thead>
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<th>ALTERNATIVES</th>
</tr>
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<td>Bogie/Suspension</td>
<td>S.R.WK 4 UNPOWERED</td>
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<td>Body Construction</td>
<td>STEEL</td>
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<td>Couplings</td>
<td>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-3 LINK INNER END</td>
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<td>Train Heating</td>
<td>ELECTRIC (BR)</td>
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<td>Max.Speed M.P.H.</td>
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<td>Min/Rad.Curve Chains</td>
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<td>TUNGSTEN</td>
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<tr>
<td>Tare Weight Tonnes</td>
<td>32.5</td>
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<tr>
<td>Gangways</td>
<td>NOT FITTED</td>
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<tr>
<td>A.W.S.</td>
<td>NOT FITTED</td>
</tr>
<tr>
<td>Train Communication</td>
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<td>Buffers</td>
<td>DRIVER/GUARD</td>
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**Traction Data for Multiple Units**

EMU- INTRODUCED CLASS 414/2 1957, CLASS 413/2 AS 414/2 1957 RECLASSED 1983.

Voltage 750/850 VOLTS D.C. THIRD RAIL

**Basic Type**

EE 361 0A

**Variants**

1A S.R. DESIGN REFERENCE CODE DX 1A.
2A A.W.S. FITTED.
DRIVING TRAILER COMPOSITE

CLASS 414/3
413/3

DTC
EE 362

14173 BOGIE CENTRES
19329 OVER HEADSTOCKS
20438 OVER BUFFERS WHEN EXTENDED

19495 OVER BODY

1295 1295
1295 1295

19 FIRST CLASS 50 SECOND CLASS

SEATS
TOILETS
COMPARTMENTS
GUARDS COMPARTMENTS
VENTILATION
CATERING EQUIPMENT

ON SOME VEHICLES THIS SALOON IS NON SMOKING

SEATS
TOILETS
COMPARTMENTS
GUARDS COMPARTMENTS
VENTILATION
CATERING EQUIPMENT

19 FIRST CLASS 50 SECOND CLASS

2
3

ISSUE  DATE
4  AUG 85

ORIGINAL DIAGRAMS FOR REFERENCE:-
BR 441

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(visit http://www.barrowmoremrg.co.uk)
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<tr>
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| 18 COMMONWEALTH BOGIES, S.R. DESIGN REFERENCE CODE DAD, A.W.S. FITTED. |
| 26 COMMONWEALTH BOGIES, S.R. DESIGN REFERENCE CODE DAD 1C, A.W.S. FITTED. |
| 3 A.W.S. FITTED. |
DRIVING TRAILER COMPOSITE

CLASS 422/1
422/2
421/1
421/2

DTC
EE 363

9'-0" 
OVER PANELS.

9'-0" 
OVER STEPBOARDS.
9'-3" 
OVER HANDRAILS.

8'-6" TRAILER BOGIE.

46'-6" BOGIE CENTRES.
63'-5" OVER HEADSTOCKS.

BUFFERS EXT.

66'-2" COUPLED.

66'-9" UNCOUPLED (OVER COUPLERS).

N.S.-NON SMOKING.

64'-9" OVER BODY.

SEATS
TOILETS
COMPARTMENTS
GUARDS COMPARTMENTS
VENTILATION
CATERING EQUIPMENT

24 FIRST CLASS 28 SECOND CLASS
2
4 FIRST CLASS PLUS 1 SECOND CLASS SALOON
-
-
-

ORIGINAL DIAGRAMS FOR REFERENCE:
BR 452

ISSUE
4
DATE
NOV 84

(visit http://www.barrowmoremrg.co.uk)
### Basic Type

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<td>Automatic Drophead(Buckeye) Outer End-Automatic Solid Shank</td>
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<tr>
<td>(Alliance No.2) Inner End</td>
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### Traction Data for Multiple Units

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### Basic Type

| EE 363 OA |

### Variants

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<th>3B S.R. Design Reference Code</th>
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BASIC TYPE

EE 364 0A

VARIANTS

1B S.R. DESIGN REFERENCE CODE FA 1A.
2B S.R. DESIGN REFERENCE CODE FA 2A.
3B S.R. DESIGN REFERENCE CODE FA 3A, A.W.S. FITTED.
4B S.R. DESIGN REFERENCE CODE FA 1A, A.W.S. FITTED.
5B S.R. DESIGN REFERENCE CODE FA 2A, A.W.S. FITTED.
6A S.R. DESIGN REFERENCE CODE FA, A.W.S. FITTED.

TRACTION DATA FOR MULTIPLE UNITS


VOLTAGE

ELECTRO PNEUMATIC
B5 (S.R.) STEEL
AUTOMATIC DROPHEAD (BUCKEYE) OUTER END - AUTOMATIC SOLID SHANK (ALLIANCE NO.2) INNER END
ELECTRIC (BR) 90
3.5 TUNGSTEN
35.5 EXPRESS ELECTRIC
NOT FITTED
DRIVER/GUARD
RETRACTABLE SPINDLE 558 X 356 OVAL OUTER END ONLY
FA

FITTED
FA 1A, FA 2A, FA 3A
DRIVING TRAILER COMPOSITE

14173 BOGIE CENTRES
19329 OVER HEADSTOCKS

2591

1346 794 1908 1918 1918 1908 2108 2108 2108 2108 1332

19752 OVER BODY

20180 OVER GANGWAYS (COUPLED)
20282 OVER GANGWAYS (UNCOPLED)

SEATS
24 FIRST CLASS 38 SECOND CLASS

TOILETS
1

COMPARTMENTS
4 FIRST CLASS PLUS 1 SECOND CLASS SALOON

GUARDS COMPARTMENTS
-

VENTILATION
-

CATERING EQUIPMENT
-

DTC
EE 365

2216 OVER BODY END STEPBOARDS
2578 OVER BOGIE STEPBOARDS
2743 OVER BODY & STEPBOARDS
2819 OVERALL

2667 OVER GUTTERS
3855 OVER VENTS
3772 OVER ROOF
3175 OVER GUTTER
3861 OVER ALL

ORIGINAL DIAGRAMS FOR REFERENCE:
BR 458

ISSUE 3
DATE MAR 86
**BRAKES**
- BOGIE/SUSPENSION
- BODY CONSTRUCTION
- COUPLINGS

**TRAIN HEATING**
- MAX.SPEED M.P.H.
- MIN.RAD.CURVE CHAINS
- LIGHTING
- TARE WEIGHT TONNES
- GANeways
- A.W.S.
- TRAIN COMMUNICATION
- BUFFERS
- S.R.DESIGN REFERENCE CODE

**BASIC TYPE**
- ELECTRO PNEUMATIC
- BS(S.R.)
- STEEL
- AUTOMATIC DROPHEAD (BUCKEYE) OUTER END
- AUTOMATIC SOLID SHANK INNER END
- (ALLIANCE NO.2 INNER END)
- ELECTRIC (BR)
- 90
- 3.5
- TUNGSTEN
- 32.5
- EXPRESS ELECTRIC
- FITTED
- DRIVER/GUARD
- RETRACTABLE SPINDLE
- 559 X 356 OVAL OUTER END ONLY
- FB

**TRACTION DATA FOR MULTIPLE UNITS**
- EMU-
- INTRODUCED 1967.
- VOLTAGE 750/850 VOLTS D.C. THIRD RAIL.

**BASIC TYPE**
- EE 365 IA

**VARIANTS**
- NONE
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**TRACTION DATA FOR MULTIPLE UNITS**


- **VOLTAGE** 750/850 VOLTS D.C. THIRD RAIL

**BASIC TYPE**

EE 366 0A

**VARIANTS**

1A A.W.S. FITTED.
**BRAKES**  
Bogie/Suspension  
Body Construction  
Couplings

**TRAIN HEATING**  
Max.Speed M.P.H.  
Min.Rad.Curve Chains  
Lighting  
Tare Weight Tonnes  
Gangways  
A.W.S.  
Train Communication  
Buffers  
S.R. Design Reference Code

**BASIC TYPE**  
Electro Pneumatic  
BS(S.R.)  
Steel  
Automatic Drophead (Buckeye) Outer End, Automatic Solid Shank (Alliance No 2) Inner End  
Electric (BR)  
50  
3.5  
Tungsten  
35.5  
Express Electric  
Not Fitted  
Driver/Guard  
Retractable Spindle-559 X 356 Oval-Outer End Only  
FB 2A

**ALTERNATIVES**  
Fitted  
FB 1A, FB 3A, FB

**TRACTION DATA FOR MULTIPLE UNITS**  
EMU  
Introduced 1967  
Voltage  
750/850 Volts D.C. Third Rail

**BASIC TYPE**  
EE 367 2A

**VARIANTS**  
3A SR Design Ref. Code FB 3A  
4A SR Design Ref. Code FB, A.W.S. Fitted  
5A SR Design Ref. Code FB 3A, A.W.S. Fitted  
6A SR Design Ref. Code FB 3A, A.W.S. Fitted  
7A A.W.S. Fitted
DRIVING TRAILER COMPOSITE

CLASS 423

DTC

EE 368

14173 BOGIE CENTRES

19329 OVER HEADSTOCKS

2667 OVER GUTTERS

3835 OVER VENTS

3772 OVER ROOF

3175 OVER GUTTER

2216 OVER BODY END STEPBOARDS

2578 OVER BOGIE STEPBOARDS

2743 OVER BODY & STEPBOARDS

2819 OVERALL

19752 OVER BODY

20180 OVER GANWAYS (COUPLED)

20282 OVER GANWAYS (UNCOPLED)

1346  794  1908  1918  1918  1908  2108  2108  2108  2108  1332

- 136 -

18 FIRST CLASS, 44 SECOND CLASS -

1 TOILETS

1 COMPARTMENTS

GUARDS COMPARTMENTS

VENTILATION

CATERING EQUIPMENT

MOD XIM 423 02 - 4 A SIDE SEATING FITTED IN 2ND CLASS COMPARTMENT

ORIGINAL DIAGRAMS FOR REFERENCE:

BR 459

ISSUE DATE

1 JUN 86

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BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS

TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
A.W.S.
TRAIN COMMUNICATION
BUFFERS
S.R. DESIGN REFERENCE CODE

BASIC TYPE
ELECTRO PNEUMATIC
B5(S.R.) STEEL
AUTOMATIC DROPHEAD (BUCKEYE) OUTER END, AUTOMATIC SOLID SHANK INNER END
ELECTRIC (BR) 90
3.5 TUNGSTEN
35.5 EXPRESS ELECTRIC NOT FITTED
DRIVER/GUARD
RETRACTABLE SPINDLE 559 X 356 OVAL OUTER END ONLY
FB 2A

ALTERNATIVES
FEDTED
FB 3A, FB

TRACTION DATA FOR MULTIPLE UNITS
EMU-
INTRODUCED 1967
VOLTAGE
750/850 VOLTS D.C. THIRD RAIL

BASIC TYPE
EE 368 OA

VARIANTS
1A SR DESIGN REF CODE FB A.W.S. FITTED.
2A SR DESIGN REF CODE FB 3A A.W.S. FITTED.
3A A.W.S. FITTED.
0B 46 2nd CLASS SEATS.
1B SR DESIGN REF CODE FB A.W.S. FITTED, 46 2nd CLASS SEATS.
2B SR DESIGN REF CODE FB 3A A.W.S. FITTED, 46 2nd CLASS SEATS.
3B A.W.S. FITTED, 46 2nd CLASS SEATS.
EF 201

BRAKES
Bogie/Suspension
Body Construction
Couplings

Train Heating
Max. Speed M.P.H.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
A.W.S.
Train Communication
Buffers

BASIC TYPE
Electro Pneumatic
Gresley ET2
Steel
Automatic Drophead (Buckeye) Outer End, Automatic Solid Shank (Alliance No 2) Inner End
Electric (BR)

ALTERNATIVES
B5

75
3.5
36.5
Not Fitted
Not Fitted
Retractable Spindle - 559 x 356 Oval - Outer End Only

TRACTION DATA FOR MULTIPLE UNITS
EMU-
Fenchurch St. - Shoeburyness introduced 1958.

Voltage

BASIC TYPE
EF 201 OA

VARIANTS
0B 85 Bogies.
BRAKES
Bogie/Suspension
Body Construction
Couplings

TRAIN HEATING
Max.Speed M.P.H.
Min.Rad.Curve Chains
Lighting
Tare Weight Tonnes
Gangways
A.V.S.
Train Communication
Buffers

BASIC TYPE
ELECTRO PNEUMATIC
GRESLEY ET3
STEEL
AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-AUTOMATIC SOLID SHANK (ALLIANCE NO.2) INNER END
ELECTRIC (BR)
75
3.5
ELECTRIC
38
NOT FITTED
FITTED
NOT FITTED
RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END ONLY

TRACTION DATA FOR MULTIPLE UNITS
EMU- GLASGOW AREA. INTRODUCED 1960.
VOLTAGE 25 & 6.25 KV A.C.OVERHEAD

BASIC TYPE
EF 202 0A

VARIANTS
NONE
BATTERY DRIVING TRAILER SECOND

CLASS 304/1

BDTS

EF 203

SEATS: 80
TOILETS: 2
COMPARTMENTS: -
GUARDS COMPARTMENTS: -
VENTILATION: -
CATERING EQUIPMENT: -

N.S. - NON SMOKING

ORIGINAL DIAGRAMS FOR REFERENCE: BR 434

ISSUE DATE

1 SEP 80

(visit http://www.barrowmoremrg.co.uk)
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**TRACTION DATA FOR MULTIPLE UNITS**


| VOLTAGE | 25 KV A.C. OVERHEAD |

**BASIC TYPE**

EF 203 0A

**VARIANTS**

NONE
BRAKES  
Bogie/Suspension  
Body Construction  
Couplings  

TRAIN HEATING  
MAX. SPEED M.P.H.  
MIN. RAD. CURVE CHAINS  
LIGHTING  
TARE WEIGHT TUNNES  
GANGWAYS  
A.V.S.  
TRAIN COMMUNICATION  
BUFFERS  

BASIC TYPE  ELECTRO PNEUMATIC  
GRESLEY ETH  
STEEL  
AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-AUTOMATIC SOLID SHANK (ALLIANCE NO.2 INNER END  
ELECTRIC (BR)  
75  
3.5  
TUNGSTEN  
37  
NOT FITTED  
FITTED  
RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END ONLY  

ALTERNATIVES  

TRACTION DATA FOR MULTIPLE UNITS  
VOLTAGE  25 KV A.C.OVERHEAD  

BASIC TYPE  
EF 204 0A  

VARIANTS  
NONE  

(visit http://www.barrowmoremrg.co.uk)
BRAKES
ELECTRO PNEUMATIC
GRESLEY ET8
STEEL
AUTOMATIC DROPHEAD(BUCKEYE) OUTER END AUTOMATIC SOLID SHANK
ALLIANCE NO.2 INNER END
ELECTRIC(BR)
75
3.5
FLUORESCENT & TUNGSTEN
35
NOT FITTED
FITTED
NOT FITTED
RETRACTABLE SPINDLE 559 X 356 OVAL OUTER END ONLY

TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONES
GANDWAYS
A.W.S.
TRAIN COMMUNICATION
BUFFERS

TRACTION DATA FOR MULTIPLE UNITS
EMU - LIVERPOOL ST.-ENFIELD & ChINGFORD.
INTRODUCED CLASS 305/3 1959 CLASS 308/3 1961.
VOLTAGE 25 & 6.25 KV A.C OVERHEAD

BASIC TYPE
EF 205 OA

VARIANTS
OB GRESLEY ET8 BOGIES.
1C REFURBISHED PUBLIC ADDRESS.
1D REFURBISHED PUBLIC ADDRESS GRESLEY ET8 BOGIES.
BATTERY DRIVING TRAILER SECOND

CLASS 305/2

BDTS

EF 206

8' 9" OVER GUTTERS
12' 4" TO TOP ROOF
16' 5" TO GUTTER
12' 8" OVER VENTS
12' 7" OVER ALL

9' 3" OVER BODY
8' 6" OVER BOGIE STEPBOARDS

5' 8" CRS

64' 0" OVER BODY

4' 3" 2' 8"
6' 3"
6' 3"
6' 3"
6' 3"
6' 3"
6' 3"
6' 3"
6' 3"

18' 9"
31' 4"

NON-SMOKING

LAV

LAV

SEATS
TOILETS
COMPARTMENTS
GUARDS COMPARTMENTS
VENTILATION
CATERING EQUIPMENT

80
2

ORIGINAL DIAGRAMS FOR REFERENCE:
BR 438

ISSUE
1
DATE
SEP' 80
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<td>BOGIE/SUSPENSION</td>
<td>GRESLEY ETS</td>
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<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
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<td>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-AUTOMATIC SOLID SHANK</td>
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<td>(ALLIANCE NO.2) INNER END</td>
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<td>3.5</td>
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<td>ELECTRIC</td>
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<tr>
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**TRACTION DATA FOR MULTIPLE UNITS**

<table>
<thead>
<tr>
<th>EMU-</th>
<th>GREAT EASTERN OUTER SUBURBAN.</th>
<th>INTRODUCED 1960.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOLTAGE</td>
<td>25 &amp; 6.25 KV A.C. OVERHEAD</td>
<td></td>
</tr>
</tbody>
</table>

**BASIC TYPE**

EF 206 0A

**VARIANTS**

NONE
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAKES</td>
<td>ELECTRO PNEUMATIC</td>
</tr>
<tr>
<td>BOGIE/SUSPENSION</td>
<td>GRESLEY ETB</td>
</tr>
<tr>
<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
</tr>
<tr>
<td>COUPLINGS</td>
<td>AUTOMATIC DROPHEAD (BUCKEYE)</td>
</tr>
<tr>
<td>TRAIN HEATING</td>
<td>OUTER END AUTOMATIC SOLID SHANK</td>
</tr>
<tr>
<td>MAX. SPEED M.P.H.</td>
<td>(ALLIANCE NO.2) INNER END</td>
</tr>
<tr>
<td>MIN. RADIUS CURVE CHAINS</td>
<td>ELECTRIC (BR)</td>
</tr>
<tr>
<td>LIGHTING</td>
<td>75</td>
</tr>
<tr>
<td>TARE WEIGHT TONNES</td>
<td>3.5</td>
</tr>
<tr>
<td>GANWAYS</td>
<td>TUNGSTEN</td>
</tr>
<tr>
<td>A.W.S.</td>
<td>36.5</td>
</tr>
<tr>
<td>TRAIN COMMUNICATION</td>
<td>NOT FITTED</td>
</tr>
<tr>
<td>BUFFERS</td>
<td>FITTED</td>
</tr>
<tr>
<td></td>
<td>RETRACTABLE SPINDLE -559 X 356 OVAL OUTER END ONLY</td>
</tr>
</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**

| END-                                          | CLASS 308/1 GREAT EASTERN OUTER SUBURBAN-CLASS 308/2 & 308/4 FENCHURCH ST.-SHOEburyNESS, |
| VOLTAGE                                       | 25 & 6.25 KV A.C. OVERHEAD         |

**BASIC TYPE**

| EF 208 0A                                      |

**VARIANTS**

| NONE                                           |
## EF 210

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRO PNEUMATIC</td>
<td>PUBLIC ADDRESS</td>
</tr>
<tr>
<td>B4/AMIO DT</td>
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</tr>
<tr>
<td>STEEL</td>
<td></td>
</tr>
<tr>
<td>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END, AUTOMATIC SOLID SHANK (BUCKEYE) INNER END</td>
<td></td>
</tr>
<tr>
<td>ELECTRIC (BR)</td>
<td></td>
</tr>
<tr>
<td>75</td>
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<td>3.5</td>
<td></td>
</tr>
<tr>
<td>TUNGSTEN</td>
<td></td>
</tr>
<tr>
<td>EXPRESS ELECTRIC INNER END ONLY</td>
<td></td>
</tr>
<tr>
<td>FITTED</td>
<td></td>
</tr>
<tr>
<td>NOT FITTED</td>
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<tr>
<td>RETRACTABLE SPINDLE - 559 X 356 - OUTER END ONLY</td>
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### TRAINING DATA FOR MULTIPLE UNITS

<table>
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<tr>
<th></th>
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<tbody>
<tr>
<td>VOLTAGE</td>
<td>25 KV A.C. OVERHEAD.</td>
<td></td>
</tr>
</tbody>
</table>

### BASIC TYPE

| EF 210 OA |

### VARIANTS

`1B FACELIFTED, PUBLIC ADDRESS FITTED`
EF 211

**EF 211 OA**

**BASIC TYPE**

- ELECTRO PNEUMATIC
- 84/AM10 DT
- STEEL
- AUTOMATIC DROPHEAD (BUCKEYE) OUTER END
- AUTOMATIC SOLID SHANK (BUCKEYE) INNER END
- ELECTRIC (BR)
- 75
- 3.5
- TUNGSTEN
- EXPRESS ELECTRIC INNER END ONLY
- FITTED
- NOT FITTED
- RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END ONLY

**ALTERNATIVES**

**PUBLIC ADDRESS**

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU**

- EUSTON-BIRMINGHAM-MANCHESTER & LIVERPOOL
- INTRODUCED 1966

- VOLTAGE 25 kV A.C. OVERHEAD

**VARIANTS**

- 18 FACELIFTED, PUBLIC ADDRESS FITTED
- 2C REFURBISHED, RECLASSIFIED CLASS 3A0/1, PUBLIC ADDRESS FITTED
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRO PNEUMATIC</td>
<td></td>
</tr>
<tr>
<td>GRESLEY ET11</td>
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<tr>
<td>STEEL</td>
<td></td>
</tr>
<tr>
<td>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-AUTOMATIC SOLID SHANK</td>
<td></td>
</tr>
<tr>
<td>(ALLIANCE NO.2 INNER END)</td>
<td></td>
</tr>
<tr>
<td>ELECTRIC (BR)</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>ELECTRIC</td>
<td></td>
</tr>
<tr>
<td>37.5</td>
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<tr>
<td>NOT FITTED</td>
<td></td>
</tr>
<tr>
<td>FITTED</td>
<td></td>
</tr>
<tr>
<td>NOT FITTED</td>
<td></td>
</tr>
<tr>
<td>RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END ONLY</td>
<td></td>
</tr>
</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**

EMU-GLASGOW AREA. INTRODUCED 1967.

VOLTAGE 25 & 6.25 KV A.C. OVERHEAD

**BASIC TYPE**

EF 212 0A

**VARIANTS**

NONE
**BASIC TYPE**

- Electro Pneumatic
- BTB & BTBd (One of each) Steel
- Automatic Drophead (Buckeye) Outer End-Automatic Solid Shank (Alliance No.2) Inner End
- Electric (BR)

**ALTERNATIVES**

- 75
- 90
- 3.5
- Fluorescent & Tungsten

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU-**

- CLASS 312/0 GREAT NORTHERN OUTER SUBURBAN-CLASS 312/1 GREAT EASTERN OUTER SUBURBAN-CLASS 312/2 LONDON MIDLAND OUTER SUBURBAN.
- Introduced 1975.
- Voltage 25 kV A.C. Overhead or 25 & 6.25 kV A.C. Overhead—see variants.

**VARIANTS**

- OB CLASS 312/2 Max. Speed 75.
- 1A CLASS 312/1-25 & 6.25 KV Equipment.
- GC CLASS 312/0 FAC LIFTED.
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAKES</td>
<td>ELECTRO PNEUMATIC</td>
</tr>
<tr>
<td>BOGIE/SUSPENSION</td>
<td>B4/AMIO T</td>
</tr>
<tr>
<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
</tr>
<tr>
<td>COUPLINGS</td>
<td>AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-AUTOMATIC SOLID SHANK (BUCKEYE) INNER END</td>
</tr>
<tr>
<td>TRAIN HEATING</td>
<td>ELECTRIC (BR)</td>
</tr>
<tr>
<td>MAX. SPEED M.P.H.</td>
<td>75</td>
</tr>
<tr>
<td>MIN. RAD. CURVE CHAINS</td>
<td>3.5</td>
</tr>
<tr>
<td>LIGHTING</td>
<td>TUNGSTEN</td>
</tr>
<tr>
<td>TARE WEIGHT TONNES</td>
<td>EXPRESS ELECTRIC INNER END ONLY</td>
</tr>
<tr>
<td>GANGWAYS</td>
<td>FITTED</td>
</tr>
<tr>
<td>A.W.S.</td>
<td>NOT FITTED</td>
</tr>
<tr>
<td>TRAIN COMMUNICATION</td>
<td>RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END ONLY</td>
</tr>
<tr>
<td>BUFFERS</td>
<td>PUBLIC ADDRESS</td>
</tr>
</tbody>
</table>

**Tracton Data for Multiple Units**

**EMU-**


- **VOLTAGE** 25 KV A.C. OVERHEAD

**Basic Type**

EF 214 OA

**Variants**

1B FACELIFTED, PUBLIC ADDRESS FITTED.
BATTERY DRIVING TRAILER SECOND

14173 BOGIE CENTRES

19329 OVER HEADSTOCKS

2667 OVER GUTTERS

3899 OVERALL

3772 OVER ROOF

3175 GUTTER

3864 OVER VENTS

2312 OVER BODY END STEPBOARDS

2743 OVER BODY & STEPBOARDS

2819 OVERALL

19757 OVER BODY

20180 OVER GANWAYS-COUPLED

20282 OVER GANWAYS-UNCOUPL ED

SEATS 60
TOILETS 2
COMPARTMENTS 
GUARDS COMPARTMENTS 
VENTILATION 
CATERING EQUIPMENT 

ISSUE 1
DATE OCT '86

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(visit http://www.barrowmoremrg.co.uk)
**EF 216**

**BRAKES**
- ELECTRO PNEUMATIC
- COMMONWEALTH
- STEEL
- AUTOMATIC DROPHEAD (BUCKEYE) OUTER END
- AUTOMATIC SOLID SHANK (ALLIANCE NO. 2) INNER END
- ELECTRIC (BR)
- 100
- 3.5
- FLUORESCENT
- 41
- PULLMAN
- PUBLIC ADDRESS
- RETRACTABLE SPINDLE 559x356 OVAL - OUTER END ONLY

**ALTERNATIVES**

**TRACTION DATA FOR MULTIPLE UNITS**

- VOLTAGE: 25 & 6.25 KV A.C. OVERHEAD.

**BASIC TYPE**
- EF 216 0A

**VARIANTS**
- NONE
TRAILER STANDARD

CLASS 315

TS

EH 217

2 875
14 170 BOGIE CENTRES
2 875

2 862

PANTO

1 635

1 635

1 620

1 288

DOOR OPEN

2 820

OVER BODY

3 977

OVER PANTOGRAPH

LOCKED DOWN

1 646

2 734

OVER TREADPLATES

1 9 920

OVER BODY

770

5 340 SALOON

1 600

5 120 SALOON

1 600

5 120 SALOON

370

28 SEATS N.S.

28 SEATS N.S.

28 SEATS N.S.

NS NON SMOKING

SEATS

84

TOILETS

-

COMPARTMENTS

-

GUARDS COMPARTMENTS

-

VENTILATION

-

CATERING EQUIPMENT

-

ORIGINAL DIAGRAMS FOR REFERENCE:

BR 467

ISSUE

5

DATE

NOV 87

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<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAKES</td>
<td>ELECTRO PNEUMATIC</td>
</tr>
<tr>
<td>Bogie/Suspension</td>
<td>BX1/T0 &amp; BX1/T1 (ONE OF EACH)</td>
</tr>
<tr>
<td>Body Construction</td>
<td>STEEL UNDERFRAME &amp; BODY FRAMING-ALUMINIUM BODY &amp; ROOF</td>
</tr>
<tr>
<td>Couplings</td>
<td>BAR</td>
</tr>
<tr>
<td>Train Heating</td>
<td>ELECTRIC-DUCTED WARM AIR</td>
</tr>
<tr>
<td>Max. Speed M.P.H.</td>
<td>75</td>
</tr>
<tr>
<td>Min. Rad. Curve Chains</td>
<td>3.5</td>
</tr>
<tr>
<td>Lighting</td>
<td>FLUORESCENT</td>
</tr>
<tr>
<td>Tare Weight Tonnes</td>
<td>32</td>
</tr>
<tr>
<td>Gangways</td>
<td>FLEXIBLE DIAPHRAGM/GRID(GRP)</td>
</tr>
<tr>
<td>Train Communication</td>
<td>PUBLIC ADDRESS</td>
</tr>
<tr>
<td>Buffers</td>
<td>NOT FITTED</td>
</tr>
</tbody>
</table>

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**TRACTION DATA FOR MULTIPLE UNITS**

<table>
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<tr>
<th>EMU</th>
<th>LIVERPOOL ST.-SHENFIELD INNER SUBURBAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>25 KV A.C. OVERHEAD</td>
</tr>
<tr>
<td></td>
<td>EQUIPPED WITH PANTOGRAPH &amp; TRANSFORMER</td>
</tr>
</tbody>
</table>

---

**BASIC TYPE**

EH 217 OA

---

**VARIANTS**

NONE
BASIC TYPE

EF 302 OA-REFURBISHED

VARIANTS

06 CLASS 308/1 GRESLEY E78 BOGIES.
BATTERY DRIVING TRAILER COMPOSITE

CLASS 302  BDTC  EF 303

559
1295
14173 BOGIE CENTRES
1295
19329 OVER HEADSTOCKS

3772 OVER ROOF
3835 OVER VENTS
3861 OVERALL
2743 OVER BODY & STEPBOARDS
2819 OVERALL

1911  1908  1918  1918  1918  1905

1283  816  1891  1900  1900  1891

19438 OVER END PANELS

SEATS  24 FIRST CLASS, 52 SECOND CLASS
TOILETS  1
COMPARTMENTS  -
GUARDS COMPARTMENTS -
VENTILATION -
CATERING EQUIPMENT -

ISSUE 2  DATE MAR 87
BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX. SPEED M.P.H.
M.N.R.A.D.CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
A.W.C.
TRAIN COMMUNICATION
BUFFERS

BASIC TYPE
ELECTRO PNEUMATIC
GRESLEY ET2
STEEL
AUTOMATIC DROPHEAD (BUCKEYE) OUTER END AUTOMATIC SOLID SHANK (ALLIANCE NO 2) INNER END
ELECTRIC (BR)
75
3.5
FLUORESCENT
36 (EST)
PULLMAN WITH RIGID (GRP) INNER PANELS INNER END ONLY
FITTED
DRIVER/GUARD-PUBLIC ADDRESS
RETRACTABLE SPINDLE 559 X 356 OVAL OUTER END CENTRE INNER END

ALTERNATIVES
B4, B5

TRACTION DATA FOR MULTIPLE UNITS
EMU:
GREAT EASTERN OUTER SUBURBAN, INTRODUCED 1958, REFURBISHED 1983.

VOLTAGE
25 & 6.25 KV A.C. OVERHEAD

BASIC TYPE
EF 303 0A-REFURBISHED

VARIANTS
0B B4 BOGIES.
0C B5 BOGIES.
EF 304

**BASIC TYPE**
- ELECTRO PNEUMATIC
- GRESLEY ETB
- STEEL
- AUTOMATIC DROPHED (BUCKEYE) OUTER END
- AUTOMATIC SOLID SHANK (ALLIANCE NO 2) INNER END
- ELECTRIC (BR)
- 75
- 3.5
- FLUORESCENT
- 35 (ESTI)
- PULLMAN WITH RIGID (GRP) INNER PANELS INNER END ONLY FITTED
- DRIVER/GUARD-PUBLIC ADDRESS
- RETRACTABLE SPINDLE-559 X 356 OVAL OUTER END-CENTRE INNER END

**ALTERNATIVES**
- GRESLEY ETB

**TRACTION DATA FOR MULTIPLE UNITS**


**VOLTAGE**
- 25 & 6.25 KV A.C. OVERHEAD

**BASIC TYPE**
EF 304 0A-REFURBISHED

**VARIANTS**
- 0B CLASS 308/1 GRESLEY ETB BOGIES.
BRAKES
Bogie/Suspension
Body Construction
Couplings

TRAIN HEATING
Max.Speed M.P.H.
Min.RAD.Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers

BASIC TYPE
Electro Pneumatic
Commonwealth
Steel
Automatic Drophead (Buckeye) Outer End
Automatic Solid Shank (Alliance No. 2) Inner End
Electric (BR)
100
3.5
Fluorescent
37.5
Pullman
Public Address
Retractable Spindle 559 x 356 Oval - Outer End Only

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS
EMU-

VOLTAGE
25 & 6.25 KV A.C. Overhead

BASIC TYPE
EF 305 0A

VARIANTS
None
### Basic Type

<table>
<thead>
<tr>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electro Pneumatic</td>
</tr>
<tr>
<td>Class 501 Trailer</td>
</tr>
<tr>
<td>Steel</td>
</tr>
<tr>
<td>Screw</td>
</tr>
<tr>
<td>Electric (GR)</td>
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<tr>
<td>70</td>
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<td>3.5</td>
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<tr>
<td>Electric</td>
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<td>30.5</td>
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<tr>
<td>NOT FITTED</td>
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<tr>
<td>NOT FITTED</td>
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<tr>
<td>NOT FITTED</td>
</tr>
<tr>
<td>SPINDLE-559 X 356 OVAL-</td>
</tr>
</tbody>
</table>

### Traction Data for Multiple Units

- **EMU-**
  - London District
  - Introduced 1957
- **Voltage**
  - 630 Volts D.C. Third Rail

### Basic Type

| EG 201 0A |

### Variants

| None |
BRAKES

BODY CONSTRUCTION

COUPLINGS

TRAIN HEATING

MAX. SPEED M.P.H.

MIN. RAD CURVE CHAINS

LIGHTING

TARE WEIGHT TONNES

GANGWAYS

A.V.S.

TRAIN COMMUNICATION

BUFFERS

BASIC TYPE

ALTERNATIVES

ELECTRO PNEUMATIC

GRESLEY ETB

STEEL

AUTOMATIC DROPHEAD (BUCKEYE) OUTER END, AUTOMATIC SOLID SHANK (ALLIANCE NO 2) INNER END

ELECTRIC (BR)

75

3.5

ELECTRIC

32

NOT FITTED

FITTED

NOT FITTED

RETRACTABLE SPINDLE-559 X 356 OVAL-OUTER END ONLY

TRACTION DATA FOR MULTIPLE UNITS

EMU-


VOLTAGE

25 KV A.C. OVERHEAD.

BASIC TYPE

EG 202 0A

VARIANTS

NONE
### Traction Data for Multiple Units

**EMU**
- **Location:** Euston-Birmingham-Manchester & Liverpool
- **Introduced:** 1960
- **Voltage:** 25 kV A.C. overhead

### Basic Type

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG 203 OA</td>
<td></td>
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</table>

### Variants

- NONE
### Basic Type

<table>
<thead>
<tr>
<th>BRAKES</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOGIE/SUSPENSION</td>
<td>ELECTRO PNEUMATIC</td>
</tr>
<tr>
<td>BODY CONSTRUCTION</td>
<td>BS(S.R.)</td>
</tr>
<tr>
<td>COUPLINGS</td>
<td>STEEL</td>
</tr>
<tr>
<td>TRAIN HEATING</td>
<td>AUTOMATIC SOLID SHANK (ALLIANCE NO.2)</td>
</tr>
<tr>
<td>MAX. SPEED M.P.H.</td>
<td>ELECTRIC (BR)</td>
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<tr>
<td>MIN. RAD CURVE CHAINS</td>
<td>90</td>
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<tr>
<td>LIGHTING</td>
<td>3.5</td>
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<tr>
<td>TARE WEIGHT TONNES</td>
<td>TUNGSTEN</td>
</tr>
<tr>
<td>GANDWAYS</td>
<td>33.5</td>
</tr>
<tr>
<td>TRAIN COMMUNICATION</td>
<td>EXPRESS ELECTRIC</td>
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<tr>
<td>BUFFERS</td>
<td>NOT FITTED</td>
</tr>
<tr>
<td>S.R. DESIGN REFERENCE CODE</td>
<td>NOT FITTED</td>
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<tr>
<td></td>
<td>BU</td>
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</table>

### Traction Data for Multiple Units


### Basic Type

<table>
<thead>
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<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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</thead>
<tbody>
<tr>
<td>EH 160 OA</td>
<td>BU 1A</td>
</tr>
</tbody>
</table>

### Variants

18 S.R. DESIGN REFERENCE CODE BU 1A.
TRAILER SECOND

CLASS 502

TS

EH 202

SEATS 102
TOILETS -
COMPARTMENTS -
GUARD'S COMPARTMENTS -
VENTILATION -
CATERING EQUIPMENT -

ORIGINAL DIAGRAMS FOR REFERENCE:
LMS 379

ISSUE 2
DATE MAY '81

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**BRAKES**
- ELECTRO PNEUMATIC
- CLASS 502 TRAILER
- STEEL
- SCREW (ONE END LOOSE COUPLED-ONE END CLOSE COUPLED)
- ELECTRIC (QR)
- 45
- 3.5
- TUNGSTEN
- 24
- NOT FITTED
- NOT FITTED
- SELF CONTAINED-457 DIA.

**TRACTION DATA FOR MULTIPLE UNITS**
- EMU- LIVERPOOL-SOUTHPORT. INTRODUCED 1939.
  - VOLTAGE 630 VOLTS D.C. THIRD RAIL

**BASIC TYPE**
- EH 202 0A

**VARIANTS**
- NONE
**BRAKES**
- ELECTRO PNEUMATIC
- CLASS 506 TRAILER
- STEEL
- SCREW
- ELECTRIC (OR)
- 3.5
- TUNGSTEN
- NOT FITTED
- NOT FITTED
- SELF CONTAINED-559 OVAL

**TRACTION DATA FOR MULTIPLE UNITS**

EMU-
- MANCHESTER-GLOSSOP-HADFIELD.
- INTRODUCED 1954.

**VOLTAGE**
- 1500 VOLTS D.C. OVERHEAD

**VARIANTS**
- NONE
BRAKES
Bogie/Suspension
Body construction
Couplings
Train Heating
Max. Speed H.P.H.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers

**BASIC TYPE**
- Electro Pneumatic
- BX1/Te
- Steel Underframe & Body Framing, Aluminium Body & Roof
- BAR
- Electric-Ducted Warm Air
- 75
- 3.5
- Fluorescent
- 25.5
- Flexible Diaphragm/Rigid (GRP) Both Ends
- Public Address
- Not Fitted

**ALTERNATIVES**
- BX1/Td

**TRACTION DATA FOR MULTIPLE UNITS**
- Voltage: 600/750 Volts D.C. Third Rail

**BASIC TYPE**
- EH 205 0A

**VARIANTS**
- 0B BX1/Td Bogies.
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ELECTRO PNEUMATIC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B4/AM10 T</td>
</tr>
<tr>
<td></td>
<td>STEEL</td>
</tr>
<tr>
<td></td>
<td>AUTOMATIC SOLID SHANK (BUCKEYE)</td>
</tr>
<tr>
<td></td>
<td>ELECTRIC (BR)</td>
</tr>
<tr>
<td></td>
<td>3.5</td>
</tr>
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<td></td>
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</tr>
<tr>
<td></td>
<td>31.5</td>
</tr>
<tr>
<td></td>
<td>EXPRESS ELECTRIC INNER END ONLY</td>
</tr>
<tr>
<td></td>
<td>NOT FITTED</td>
</tr>
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<td></td>
<td>NOT FITTED</td>
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</table>

**TRACTION DATA FOR MULTIPLE UNITS**

EMU-
EUSTON-BIRMINGHAM-MANCHESTER & LIVERPOOL.
INTRODUCED 1966.

| VOLTAGE | 25 KV A.C. OVERHEAD |

**BASIC TYPE**

EH 208 0A

**VARIANTS**

NONE
TRAILER SECOND

CLASS 312/0
312/1
312/2

TS
EH 209

46-6" BOGIE CENTRES.
63-5" OVER HEADSTOCKS.
65-4" OVER BODY.

7-6" OVER END
ASCENDING
STEPS.

8-5" OVER GUTTERS.

6-6" OVER ROOF.

12-6" OVER VENTS.

0.5" TO GUTTER.

66-2 1/2" (COUPLED)
66-6 1/2" (UNCOPLED)

SEATS
98

TOILETS
-

COMPARTMENTS
-

GUARDS COMPARTMENTS
-

VENTILATION
-

CATERING EQUIPMENT
-

N.S. - NON SMOKING.

ORIGINAL DIAGRAMS FOR REFERENCE:
BR 416

ISSUE
3

DATE
MAR 87

(visit http://www.barrowmoremrg.co.uk)
EH 209

**Basic Type**

<table>
<thead>
<tr>
<th>Basic Type</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electro Pneumatic</td>
<td>75</td>
</tr>
<tr>
<td>BTBb &amp; BTBc (one of each)</td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>Automatic Solid Shank (Alliance No.2)</td>
<td></td>
</tr>
<tr>
<td>Electric (BR)</td>
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</tr>
<tr>
<td>90</td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Fluorescent</td>
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<tr>
<td>30.5</td>
<td></td>
</tr>
<tr>
<td>Tare Weight Tonnes</td>
<td></td>
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<tr>
<td>25 &amp; 6.25 KV</td>
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</tbody>
</table>

**Traction Data for Multiple Units**

**EMU**

- Class 312/0 Great Northern Outer Suburban-Class 312/1 Great Eastern Outer Suburban-Class 312/2 London Midland Outer Suburban.
- Introduced 1975.

**Basic Type**

EH 209 0A-Class 312/0

**Variants**

- 0B Class 312/2—Max. Speed 75.
- 1A Class 312/1—25 & 6.25 kV Equipment.
- 0C Class 312/0—Facelifted.
TRAILER SECOND

CLASS 313

TS

EH 210

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EH 210

BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TUNNES
GANGWAYS
TRAIN COMMUNICATION
BUFFERS

BASIC TYPE

ELECTRO PNEUMATIC
BXI/TA & BXI/TB (ONE OF EACH)
STEEL UNDERFRAME & BODY FRAMING-ALUMINIUM BODY & ROOF
BAR
WASTE HEAT RECOVERY-DUCTED WARM AIR
75
3.5
FLUORESCENT
31
FLEXIBLE DIAPHRAGM/RIGID (GRP)
PUBLIC ADDRESS
NOT FITTED

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS

EMU- GREAT NORTHERN INNER SUBURBAN. INTRODUCED 1976.

VOLTAGE 25 KV A.C. OVERHEAD & 750 VOLTS D.C. THIRD RAIL

BASIC TYPE

EH 210 OA

VARIANTS

NONE
EH 211

BRAKES

Bogie/Suspension

Body Construction

Couplings

Train Heating

Max. Speed N.P.H.

Min. Rad. Curve Chains

Lighting

Tare Weight Tonnes

Gangways

Train Communication

Buffers

**BASIC TYPE**

**ALTERNATIVES**

ELECTRO PNEUMATIC

Bxi. To & Bxi/Tf (One of Each)

Steel Underframe & Body Framing, Aluminium Body & Roof

Bar

Electric-Ducted Warm Air

70

3.5

Fluorescent

33

Flexible Diaphragm/Rigid (GRP)

Public Address

Not Fitted

**TRACTION DATA FOR MULTIPLE UNITS**

EHU-

Glasgow Area

Introduced 1979.

Voltage

25 & 6.25 KV A.C. Overhead

**VARIANTS**

None
### Basic Type

<table>
<thead>
<tr>
<th>Brakes</th>
<th>Electro Pneumatic Class 501 Trailer</th>
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<tbody>
<tr>
<td>Bogie/Suspension</td>
<td>Steel</td>
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<tr>
<td>Body Construction</td>
<td>Screw</td>
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<tr>
<td>Couplings</td>
<td>Electric (6R)</td>
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<td>Train Heating</td>
<td>70</td>
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<tr>
<td>Max Speed N.P.H.</td>
<td>3.5</td>
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<tr>
<td>Min. Rad. Curve Chains</td>
<td>Tungsten</td>
</tr>
<tr>
<td>Lighting</td>
<td>29.5</td>
</tr>
<tr>
<td>Tare Weight Tonnes</td>
<td>Not Fitted</td>
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<tr>
<td>Gangways</td>
<td>Not Fitted</td>
</tr>
<tr>
<td>Train Communication</td>
<td>Spindle-559 x 114 Oval</td>
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<tr>
<td>Buffers</td>
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</table>

### Traction Data for Multiple Units

<table>
<thead>
<tr>
<th>EMU</th>
<th>London District 1957 converted from compartments to open 1975.</th>
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</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>630 Volts D.C. Third Rail</td>
</tr>
</tbody>
</table>

### Basic Type

| EH 213 OA          |

### Variants

| None               |
### Traction Data for Multiple Units

**EMU:** Virral & Mersey. Introduced 1938 & 1956.

| Voltage | 650 Volts D.C. Third Rail |

### Basic Type

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electro Pneumatic</td>
<td>ELECTRO PNEUMATIC</td>
</tr>
<tr>
<td>Class 503 Trailer Steel</td>
<td>CLASS 503 TRAILER STEEL</td>
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<tr>
<td>Permanent Screw Electric (VR)</td>
<td>PERMANENT SCREW ELECTRIC (VR)</td>
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<tr>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Tungsten</td>
<td>TUNGSTEN</td>
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<tr>
<td>21.5</td>
<td>21.5</td>
</tr>
</tbody>
</table>

### Variants

**NONE**

**EH 214 0A**

**BRKES**

- Bogie/Suspension
- Body Construction
- Couplings
- Train Heating
- Max. Speed N.P.H.
- Min. Rad. Curve Chains
- Lighting
- Tare Weight Tonnes
- Gangways
- Train Communication
- Buffers

*Original diagrams courtesy of Eddie Knorn. This PDF copy by J.D. Faulkner, 2012 (visit http://www.barrowmoremrg.co.uk)*
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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</thead>
<tbody>
<tr>
<td>ELECTRO PNEUMATIC</td>
<td>STEEL UNDERFRAME &amp; BODY FRAMING—ALUMINIUM BODY &amp; ROOF</td>
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<tr>
<td>BX1/T6</td>
<td>BAR</td>
</tr>
<tr>
<td>ELECTRIC-DUCTED WARM AIR</td>
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<tr>
<td>75</td>
<td>3.5</td>
</tr>
<tr>
<td>fluorescent</td>
<td>Flexible diaphragm/GRP</td>
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<tr>
<td>25.5</td>
<td>Public address</td>
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<td>NOT FITTED</td>
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</tbody>
</table>

TRACTION DATA FOR MULTIPLE UNITS

EMU—Liverpool St.—Shenfield Inner Suburban

VOLTAGE 25 KV A.C. OVERHEAD

BASIC TYPE

EH 216 0A

VARIANTS

NONE
**EH 217**

**BRAKES**
- Bogie/Suspension
- Body Construction
- Couplings
- Train Heating
- Max. Speed M.P.H.
- Min./Rad./Curve Chains
- Lighting
- Tare Weight Tonnes
- Gangways
- Train Communication
- Buffers

**BASIC TYPE**
- Electro Pneumatic
  - Bxi/Ts & Bxi/Tf (One of each)
- Steel Underframe & Body Framing - Aluminium Body & Roof
- Bar
- Electric-Ducted Warm Air
- 75
- 3.5
- Fluorescent
- 32
- Flexible Diaphragm/Rigid (GRP)
- Public Address
- Not Fitted

**ALTERNATIVES**

---

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU-**
- Liverpool St.-Shenfield Inner Suburban

**VOLTAGE**
- 25 kV A.C. Overhead
- Equipped with Pantograph & Transformer

---

**BASIC TYPE**
- EH 217 OA

**VARIANTS**
- None
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRO PNEUMATIC</td>
<td>ELECTRIC-DUCTED WARM AIR</td>
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<tr>
<td>BXR</td>
<td>75</td>
</tr>
<tr>
<td>STEEL UNDERFRAME &amp; BODY FRAMING-ALUMINIUM BODY &amp; ROOF</td>
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</tr>
<tr>
<td>BAR</td>
<td>FLEXIBLE DIAPHRAGM/RIGID (GRP)</td>
</tr>
<tr>
<td></td>
<td>PUBLIC ADDRESS</td>
</tr>
<tr>
<td></td>
<td>NOT FITTED</td>
</tr>
</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**

EMU - INTRODUCED 1980.

| VOLTAGE | 750/850 VOLTS D.C. THIRD RAIL |

**BASIC TYPE**

EH 218 0A

**VARIANTS**

NONE
EH 219

BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
TRAIN COMMUNICATION
BUFFERS

BASIC TYPE
ELECTRO PNEUMATIC
BXi/TJ
STEEL UNDERFRAME & BODY FRAMING, ALUMINIUM BODY & ROOF BAR
ELECTRIC-DUCTED WARM AIR
75
3.5
FLUORESCENT
25.5
FLEXIBLE DIAPHRAGM/RIGID(GRP)
PUBLIC ADDRESS
NOT FITTED

ALTERNATIVES
AUTOMATIC SOLID SHANK (BUCKEYE)

TRACTION DATA FOR MULTIPLE UNITS
EMU
INTRODUCED 1980.
VOLTAGE 750/850 VOLTS D.C. THIRD RAIL

BASIC TYPE
EH 219 OA

VARIANTS
1B AUTOMATIC SOLID SHANK (BUCKEYE) COUPLINGS.
EH 221

**BRAKES**
- BOGIE/SUSPENSION
- BODY CONSTRUCTION
- COUPLINGS
- TRAIN HEATING
- MAX SPEED M.P.H.
- MIN/RAD, CURVE CHAINS
- LIGHTING
- TARE WEIGHT TONNES
- GANGWAYS
- TRAIN COMMUNICATION
- BUFFERS

**BASIC TYPE**
- ELECTRO-PNEUMATIC
- BTO
- STEEL
- BAR
- ELECTRIC(BRA) WITH PRESSURE VENTILATION & HEATING
- 75
- 3.5
- FLUORESCENT
- 27.1
- FLEXIBLE DIAPHRAGM/RIGID(GRP)
- PUBLIC ADDRESS
- NOT FITTED

**ALTERNATIVES**

**TRACTION DATA FOR MULTIPLE UNITS**

EMU-
- SOUTHERN REGION ROUTES, INTRODUCED 1982.
- VOLTAGE
  - 750 VOLTS D.C. THIRD RAIL

**BASIC TYPE**
- EH 221 0A

**VARIANTS**
- NONE
BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max. Speed M.P.H.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
A.W.S.
Train Communication
Buffers

**BASIC TYPE**

- Electro Pneumatic
- Gresley ETT
- Steel
- Automatic Solid Shank (Buckeye)
- Electric (BR)
- 75
- 3.5
- Fluorescent
- 31
- Pullman with Rigid (GRP) Inner Panels
- Fitted
- Public Address
- Centre

**ALTERNATIVES**

- B4

---

**TRACTION DATA FOR MULTIPLE UNITS**


25 & 6.25 KV A.C. OVERHEAD

---

**BASIC TYPE**

EH 222 DA

---

**VARIANTS**

- DB B4 Bogies.
TRAILER STANDARD

CLASS 302
305/2
308/1

TS
EH 223

1295
14173 BOGIE CENTRES
19329 OVER HEADSTOCKS

2038
2051
2040
1518
1907
1918
1918
1918
1918
1905

LUGGAGE SHELVES

NON-SMOKING
TOILET

19358 OVER END PANELS
20180 OVER GANWAYS (COUPLED)

SEATS
86

TOILETS
1

COMPARTMENTS
-

GUARDS COMPARTMENTS
-

VENTILATION
-

CATERING EQUIPMENT
-

3772 OVER ROOF
3175 OVER GUTTERS
3835 OVER VENTS
3861 OVER ALL

2743

OVER BODY & STEPBOARDS 2819

OVERALL

ISSUE
4

DATE
NOV 87
BRAKES
Bogie/Suspension
Body construction
Couplings
Train heating
Max. Speed m.p.h.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers

**BASIC TYPE**

ELECTRO PNEUMATIC
GRESLEY ET5
STEEL
AUTOMATIC SOLID SHANK (ALLIANCE NO 2)
ELECTRIC (BR)
75
3.5
FLUORESCENT
30 (EST)
PULLMAN WITH RIGID (GRP) INNER PANELS
PUBLIC ADDRESS
CENTRE

**ALTERNATIVES**

GRESLEY ET8, GRESLEY ET2, 84, B5

---

**TRACTION DATA FOR MULTIPLE UNITS**


**VOLTAGE**

25 & 6.25 KVA C. OVERHEAD

---

**BASIC TYPE**

EH 223 OA - REFURBISHED

**VARIANTS**

OF CLASS 308/1 GRESLEY ET8 BOGIES.
OC CLASS 302 GRESLEY ET2 BOGIES.
OD CLASS 302 B4 BOGIES.
OE CLASS 302 B5 BOGIES.
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<td>BAR</td>
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<td>ELECTRIC (BR)</td>
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<td>3.5</td>
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<tr>
<td>FLUORESCENT</td>
<td>FLEXIBLE DIAPHRAGM/ RIGID (GRP)</td>
</tr>
<tr>
<td>27.1</td>
<td>PUBLIC ADDRESS</td>
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<tr>
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</table>

**TRACTION DATA FOR MULTIPLE UNITS**

EMU - SOUTHERN REGION ROUTES. INTRODUCED 1985

| VOLTAGE | 750 VOLTS D.C. THIRD RAIL |

**BASIC TYPE**

EH 224 OA

**VARIANTIS**

NONE
<table>
<thead>
<tr>
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<tbody>
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<tr>
<td>GRESLEY ETB</td>
<td>STEEL</td>
</tr>
<tr>
<td>AUTOMATIC SOLID SHANK(ALLIANCE NO.2)</td>
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<tr>
<td>ELECTRIC(BR)</td>
<td>TUNGSTEN</td>
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<tr>
<td>TS</td>
<td>3.5</td>
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<tr>
<td>NOT FITTED</td>
<td>31.5</td>
</tr>
<tr>
<td>NOT FITTED</td>
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</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**

EMU-


VOLTAGE 25 KV A.C. OVERHEAD

**BASIC TYPE**

EH 225 0A

**VARIANTS**

NONE
TRAILER SECOND

CLASS 304/2
304/3

TS

EH 226

1295

14173 BOGIE CENTRES

1295

19329 OVER HEADSTOCKS

3772 OVER ROOF
3880 OVER VENTS

2743 OVER BODY & STEPBS 2819

OVERALL

470 UNCOUPLED
425 COUPLED

19358 OVER BODY

SEATS 86
TOILETS 3 PLUS 1 SALOON
COMPARTMENTS
GUARDS COMPARTMENTS
VENTILATION
CATERING EQUIPMENT

NS+NON SMOKING

ORIGINAL DIAGRAMS FOR REFERENCE:
BR 457

ISSUE 1
DATE MAR'85

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**EH 226**

**BRAKES**
- Electro Pneumatic
- Gresley ETB
- Steel
- Automatic solid Shank
- Electric (BR)
- 75
- 3.5
- Tungsten
- 32.5
- Not fitted

**ALTERNATIVES**

**TRACTION DATA FOR MULTIPLE UNITS**
- EMU:
- Voltage: 25 kV A.C. Overhead

**BASIC TYPE**
- EH 226 0A

**VARIANTS**
- None
**BRAKES**
- ELECTRO PNEUMATIC
- STEEL
- AUTOMATIC SOLID SHANK (ALLIANCE NO. 2)
- ELECTRIC (BR)

**ALTERNATIVES**
- 100
- 3.5
- TUNGSTEN
- PULLMAN
- PUBLIC ADDRESS
- NOT FITTED

**BRIDGE/ SUSPENSION**
**BODY CONSTRUCTION**
**COUPLINGS**
**TRAIN HEATING**
**MAX. SPEED M.P.H.**
**MIN. RAD. CURVE CHAINS**
**LIGHTING**
**TARE WEIGHT TONNES**
**GANGWAYS**
**TRAIN COMMUNICATION**
**BUFFERS**

---

**TRACTION DATA FOR MULTIPLE UNITS**

**VOLTAGE**
- 25 & 6.25 KV A.C. OVERHEAD.
EH 228

BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max. Speed m.p.h.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers

**BASIC TYPE**
Electro Pneumatic
Commonwealth
Steel
Automatic Solid Shank (Alliance No. 2)
Electric (BR)

**ALTERNATIVES**

100
3.5
Fluorescent & Tungsten
35
Pullman
Public Address
Not Fitted

**TRACTION DATA FOR MULTIPLE UNITS**

EMU-
Liverpool St., Clacton & Walton Introduced 1962, Refurbished 1985.


**BASIC TYPE**

EH 228 OA

**VARIANTS**

None
<table>
<thead>
<tr>
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<tbody>
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<tr>
<td>BOGIE/SUSPENSION</td>
<td>COMMONWEALTH</td>
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<tr>
<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
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<tr>
<td>COUPLINGS</td>
<td>AUTOMATIC SOLID SHANK (ALLIANCE NO.2)</td>
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<tr>
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<td>ELECTRIC (BR)</td>
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<tr>
<td>MAX SPEED M.P.H.</td>
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<tr>
<td>MIN R.A.D. CURVE LENGTH</td>
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<tr>
<td>LIGHTING</td>
<td>FLUORESCENT &amp; TUNGSTEN</td>
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<tr>
<td>TARE WEIGHT TONNES</td>
<td>35</td>
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<tr>
<td>GANGWAYS</td>
<td>PULLMAN</td>
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<td>TRAIN COMMUNICATION</td>
<td>PUBLIC ADDRESS</td>
</tr>
<tr>
<td>BUFFERS</td>
<td>NOT FITTED</td>
</tr>
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</table>

**TRACTION DATA FOR MULTIPLE UNITS**


| VOLTAGE | 25 & 6.25 KV A.C. OVERHEAD. |

**BASIC TYPE**

EH 229 OA

**VARIANTS**

NONE
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
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<tbody>
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<td>Bogie/Suspension</td>
<td>B4/AMID T</td>
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<td>STEEL</td>
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<tr>
<td>COUPLINGS</td>
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<tr>
<td>TRAIN HEATING</td>
<td>ELECTRIC (BR)</td>
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<tr>
<td>MAX. SPEED M.P.H.</td>
<td>75</td>
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<tr>
<td>MIN. RAD. CURVE CHAINS</td>
<td>3.5</td>
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<tr>
<td>LIGHTING</td>
<td>ELECTRIC</td>
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<tr>
<td>TARE WEIGHT TONNES</td>
<td>31.5</td>
</tr>
<tr>
<td>GANGWAYS</td>
<td>EXPRESS ELECTRIC</td>
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<tr>
<td>TRAIN COMMUNICATION</td>
<td>PUBLIC ADDRESS</td>
</tr>
<tr>
<td>BUFFERS</td>
<td>NOT FITTED</td>
</tr>
</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**


VOLTAGE 25 KV A.C. OVERHEAD.

**BASIC TYPE**

EH 232 0A

**VARIANTS**

1B REFURBISHED & RECLASSIFIED CLASS 310/1
TRAILER STANDARD (AUXILIARY)

CLASS 319
TS
EH 234

14170 BOGIE CENTRES
19330 OVER HEADSTOCKS
19920 OVER BODY

1812  3648  1280  5700  1280  5460

TOILET
SMOKING
SMOKING
NO SMOKING

SEATS
76
TOILETS
2
COMPARTMENTS
-
GUARDS COMPARTMENTS
-
VENTILATION
-
CATERING EQUIPMENT
-

1010 THRO'WAY
1010 THRO'WAY

ISSUE DATE
1 JAN 88

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(visit http://www.barrowmoremrg.co.uk)
EH 234

BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX SPEED M.P.H.
MIN.RAD.CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANWAYS
A.W.S.
TRAIN COMMUNICATION
BUFFERS

**BASIC TYPE**

- ELECTRO-PNEUMATIC
- T5-7c & T5-7d (ONE OF EACH)
- STEEL
- BAR
- ELECTRIC (BR)
- 100
- 3.5
- FLUORESCENT
- 31
- FLEXIBLE DIAPHRAGM/ RIGID (GRP)
- FITTED
- PUBLIC ADDRESS
- NOT FITTED

**ALTERNATIVES**

**TRACTION DATA FOR MULTIPLE UNITS**

EMU

- CROSS LONDON SERVICES, INTRODUCED 1887

- VOLTAGE
  - 25 KV A.C. OVERHEAD & 750V D.C. THIRD RAIL

**VARIANTS**

NONE
<table>
<thead>
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<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tbody>
<tr>
<td>BRAKES</td>
<td>ELECTRO-PNEUMATIC</td>
</tr>
<tr>
<td>BOGIE/SUSPENSION</td>
<td>T3-7n &amp; T3-7m (ONE OF EACH)</td>
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<tr>
<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
</tr>
<tr>
<td>COUPLINGS</td>
<td>BAR</td>
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<tr>
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<tr>
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<tr>
<td>MIN. RAD. CURVE METRES</td>
<td>71</td>
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<td>LIGHTING</td>
<td>FLUORESCENT</td>
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<tr>
<td>GANGWAYS</td>
<td>FLEXIBLE DIAPHRAGM/RIGID(GRP)</td>
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<tr>
<td>A.W.S.</td>
<td>NOT FITTED</td>
</tr>
<tr>
<td>TRAIN COMMUNICATION</td>
<td>PUBLIC ADDRESS</td>
</tr>
<tr>
<td>BUFFERS</td>
<td>NOT FITTED</td>
</tr>
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</table>

**TRACTION DATA FOR MULTIPLE UNITS**

EMU - ANGLIA-ELECTRICS INTRODUCED 1988/89.

| VOLTAGE | 25 KV A.C. OVERHEAD |

**BASIC TYPE**

EH 235 0A

**VARIANTS**

NONE
## Traction Data for Multiple Units

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<th>EMU-</th>
<th>WATERLOO &amp; CITY.</th>
<th>Introduced 1940.</th>
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<tbody>
<tr>
<td>Voltage</td>
<td>750/850 Volts D.C. Third Rail</td>
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### Basic Type

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<th>Alternatives</th>
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### Variants

- None
EH 261

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<td>BRAKES</td>
<td>ELECTRO PNEUMATIC</td>
</tr>
<tr>
<td>Bogie/Suspension</td>
<td>EX LONDON TRANSPORT</td>
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<tr>
<td>Body Construction</td>
<td>STEEL UNDERFRAME, BODY &amp; ROOF-WOODEN BODY FRAMING</td>
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<tr>
<td>Couplings</td>
<td>EX LONDON TRANSPORT</td>
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<tr>
<td>Train Heating</td>
<td>ELECTRIC (OR)</td>
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<tr>
<td>Max. Speed M.P.H.</td>
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<td>Min. Rad. Curve Chains</td>
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<td>Lighting</td>
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<td>S.R. Design Reference Code</td>
<td>DAF</td>
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</table>

TRACTION DATA FOR MULTIPLE UNITS

EMU- ISLE OF WIGHT STOCK. INTRODUCED 1967-EX LONDON TRANSPORT STOCK.

Voltage 630 Volts D.C. THIRD RAIL

BASIC TYPE

EH 261 0A

VARIANTS

NONE
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIR</td>
<td>S.R. STANDARD 229 X 114</td>
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<tr>
<td></td>
<td>STEEL</td>
</tr>
<tr>
<td></td>
<td>3 LINK</td>
</tr>
<tr>
<td></td>
<td>ELECTRIC (BR)</td>
</tr>
<tr>
<td></td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>3.5</td>
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<tr>
<td></td>
<td>ELECTRIC</td>
</tr>
<tr>
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<td>28</td>
</tr>
<tr>
<td></td>
<td>NOT FITTED</td>
</tr>
<tr>
<td></td>
<td>NOT FITTED</td>
</tr>
<tr>
<td></td>
<td>CENTRE ONE END-CENTRE WEARING PLATE OTHER END</td>
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<td>DL</td>
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### Traction Data for Multiple Units

**EMU** - Introduced 1946.

- **Voltage**: 750/850 Volts D.C. Third Rail

### Basic Type

**EH 262 0A**

### Variants

**None**
EH 263

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
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<tr>
<td>AIR</td>
<td>S.R.STANDARD-229X114</td>
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<td>3 LINK</td>
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<td></td>
<td>ELECTRIC(BR)</td>
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<tr>
<td>75</td>
<td>3.5</td>
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<td>27</td>
<td>TUNGSTEN</td>
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<tr>
<td></td>
<td>NOT FITTED</td>
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<tr>
<td></td>
<td>NOT FITTED</td>
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<tr>
<td></td>
<td>CENTRE ONE END-CENTRE WEARING PLATE OTHER END</td>
</tr>
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</table>

TRACTION DATA FOR MULTIPLE UNITS

EMU- INTRODUCED 1946.

VOLTAGE 750/850 VOLTS D.C. THIRD RAIL

BASIC TYPE

EH 263 OA

VARIANTS

NONE
### Basic Type
- Air
- S.R. Standard 229 x 114
- Steel
- 3 Link
- Electric (BR)
- 75
- 3.5
- Electric
- 28
- Not Fitted
- Not Fitted
- Centre Both Ends
- DM

### Traction Data for Multiple Units
- **EMU**: Introduced 1946.
- **Voltage**: 750/850 Volts D.C. Third Rail

### EH 265 0A

### Variants
- None
## BASIC TYPE - ALTERNATIVES

<table>
<thead>
<tr>
<th>BRKES</th>
<th>BASIC TYPE</th>
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<tr>
<td>BOGIE/SUSPENSION</td>
<td>AIR</td>
<td>S.R.STANDARD 229 X 114</td>
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<tr>
<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
<td></td>
</tr>
<tr>
<td>COUPLINGS</td>
<td>3 LINK</td>
<td>ELECTRIC (BR)</td>
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<tr>
<td>TRAIN HEATING</td>
<td>75</td>
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<tr>
<td>MAX.SPEED M.P.H.</td>
<td>3.5</td>
<td></td>
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<tr>
<td>MIN.RAD.CURVE CHAINS</td>
<td>ELECTRIC</td>
<td></td>
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<tr>
<td>LIGHTING</td>
<td>26</td>
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<tr>
<td>TARE WEIGHT TUNNES</td>
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<tr>
<td>GANGWAYS</td>
<td>CENTRE BOTH ENDS</td>
<td>DR</td>
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<td>BUFFERS</td>
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## TRACTION DATA FOR MULTIPLE UNITS

EMU- INTRODUCED 1946.

VOLTAGE 750/850 VOLTS D.C. THIRD RAIL

## BASIC TYPE

EH 265 0A

## VARIANTS

OB MODIFIED INTERIOR WITH TRANSVERSE SEMI-PARTITIONS.
TRAILER SECOND

CLASS 415/0

SEATS 108
TOILETS -
COMPARTMENTS 9
GUARDS COMPARTMENTS -
VENTILATION -
CATERING EQUIPMENT -

ORIGINAL DIAGRAMS FOR REFERENCE:--
S.R.2314

ISSUE 3    DATE NOV 84

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EH 267

BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANWAY
TRAIN COMMUNICATION
BUFFERS
S.R. DESIGN REFERENCE CODE

BASIC TYPE
ELECTRO PNEUMATIC
S.R. STANDARD 229 X 114
STEEL
3 LINK
ELECTRIC (BR)
75
3.5
TUNGSTEN
28
NOT FITTED
NOT FITTED
CENTRE ONE END-CENTRE WEARING PLATE OTHER END
DU

ALTERNATIVES
DU 1A

TRACTION DATA FOR MULTIPLE UNITS
EMU
VOLTAGE
750/650 VOLTS D.C. THIRD RAIL

BASIC TYPE
EH 267 OA

VARIANTS
1B S.R. DESIGN REFERENCE CODE DU 1A.
**BRAKES**
- ELECTRO PNEUMATIC
- S.R. STANDARD 229 X 114
- STEEL
- 3 LINK
- ELECTRIC (BR)
- 75
- 3.5
- TUNGSTEN
- 28
- NOT FITTED
- NOT FITTED
- CENTRE ONE END-CENTRE WEARING PLATE OTHER END DU

**ALTERNATIVES**
- DU 1A

---

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU**

**VOLTAGE**
- 750/850 VOLTS D.C. THIRD RAIL

---

**BASIC TYPE**
- EH 268 0A

---

**VARIANTS**
- 1B S.R. DESIGN REFERENCE CODE DU 1A.
<table>
<thead>
<tr>
<th>Brakes</th>
<th>Basic Type</th>
<th>Alternatives</th>
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<tbody>
<tr>
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<tr>
<td>Body Construction</td>
<td>Steel</td>
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<tr>
<td>Couplings</td>
<td>Electric(BR)</td>
<td>Electric(BR)</td>
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<tr>
<td>Train Heating</td>
<td>Max Speed M.P.H.</td>
<td>75</td>
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<td>Min Radius Curve Chains</td>
<td>3.5</td>
<td>Tungsten</td>
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<td>Lighting</td>
<td>Tare Weight Tonnes</td>
<td>27</td>
</tr>
<tr>
<td>Gangways</td>
<td>Not Fitted</td>
<td>Not Fitted</td>
</tr>
<tr>
<td>Train Communication</td>
<td>Not Fitted</td>
<td>Not Fitted</td>
</tr>
<tr>
<td>Buffers</td>
<td>Centre</td>
<td>Centre</td>
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<td>S.R. Design Reference Code</td>
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**Traction Data for Multiple Units**


VOLTAGE: 750/850 Volts D.C. Third Rail

**Basic Type**

EH 270 OA

**Variants**

NONE
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<tr>
<td>ELECTRO PNEUMATIC</td>
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<tr>
<td>S.R.MK 3D UNPOWERED</td>
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<tr>
<td>STEEL</td>
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<tr>
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<td></td>
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<td>TUNGSTEN</td>
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<td>29.5</td>
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<td>DAA 1A, DAB, DAB 1A</td>
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<td>DAA</td>
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**TRACTION DATA FOR MULTIPLE UNITS**


**VOLTAGE** 750/850 VOLTS D.C. THIRD RAIL

<table>
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<th>VARIANTS</th>
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</thead>
<tbody>
<tr>
<td>EH 271 OA</td>
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</tbody>
</table>

**OB SR MK 3C UNPOWERED BOGIES.**

**OC SR DESIGN REF. CODE DAA 1A, SR MK 3C UNPOWERED BOGIES.**

**OD SR DESIGN REF. CODE DAA 1A, B5(SR) BOGIES.**

**I A SR DESIGN REF. CODE DAB, BUFFERS CENTRE ONE END-CENTRE WEARING PLATE OTHER END.**

**I B SR DESIGN REF. CODE DAB, BUFFERS CENTRE ONE END-CENTRE WEARING PLATE OTHER END, SR MK 3C UNPOWERED BOGIES.**

**I C SR DESIGN REF. CODE DAB 1A, BUFFERS CENTRE ONE END-CENTRE WEARING PLATE OTHER END, SR MK 3C UNPOWERED BOGIES.**

**I D SR DESIGN REF. CODE DAB 1A, BUFFERS CENTRE ONE END-CENTRE WEARING PLATE OTHER END. B5(SR) BOGIES.**
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<tr>
<td>AUTOMATIC SOLID SHANK (ALLIANCE NO.2)</td>
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<tr>
<td>ELECTRIC (BR)</td>
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<tr>
<td>90</td>
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<td>ELECTRIC</td>
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<tr>
<td>EXPRESS ELECTRIC</td>
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</table>

**Traction Data for Multiple Units**

EMU- INTRODUCED 1958.

**Voltage**

750/650 Volts D.C. Third Rail

**Basic Type**

EH 273 0A

**Variants**

18 COMMONWEALTH BOGIES, S.R.DESIGN REFERENCE CODE BN.
**EH 274**

<table>
<thead>
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<td>AUTOMATIC SOLID SHANK (ALLIANCE NO.2)</td>
</tr>
<tr>
<td>ELECTRIC (BR)</td>
<td>90</td>
</tr>
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<td>3.5</td>
<td>ELECTRIC</td>
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<td>31.5</td>
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<td>BM 28</td>
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**TRACTION DATA FOR MULTIPLE UNITS**

EMU- INTRODUCED 1958.

VOLTAGE 750/650 VOLTS D.C. THIRD RAIL

**BASIC TYPE**

EH 274 0A

**VARIANTS**

NONE
TRAILER SECOND

CLASS 421/1
421/2

TS
EH 275

ORIGINAL DIAGRAMS FOR REFERENCE-
BR 472

ISSUE 2
DATE NOV '84

SEATS 72
TOILETS -
COMPARTMENTS -
GUARDS COMPARTMENTS -
VENTILATION -
CATERING EQUIPMENT -
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<thead>
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<tr>
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<td>B5(S.R.)</td>
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<tr>
<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
</tr>
<tr>
<td>COUPLINGS</td>
<td>AUTOMATIC SOLID SHANK(ALLiance NO.2)</td>
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<tr>
<td>TRAIN HEATING</td>
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<td>TUNGSTEN</td>
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<tr>
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<tr>
<td>GANGWAYS</td>
<td>EXPRESS ELECTRIC</td>
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<tr>
<td>TRAIN COMMUNICATION</td>
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</table>

**TRACTION DATA FOR MULTIPLE UNITS**

- **EMU**
  - **VOLTAGE** 750/850 VOLTS D.C. THIRD RAIL

**BASIC TYPE**

EH 275 OA

**VARIANTS**

1B S.R. DESIGN REFERENCE CODE BO 1A.
### Brakes
Brakes
Body Construction
Couplings
Train Heating
Max. Speed N.P.H.
Min./Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
S.R. Design Reference Code

### Basic Type
<table>
<thead>
<tr>
<th>ELECTRO PNEUMATIC</th>
<th>STEEL</th>
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<tbody>
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<td>65 (S.R.)</td>
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<tr>
<td>AUTOMATIC SOLID SHANK (ALLIANCE NO. 2)</td>
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<tr>
<td>9D</td>
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</tr>
<tr>
<td>Tungsten</td>
<td>31.5</td>
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<tr>
<td>EXPRESS ELECTRIC</td>
<td></td>
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<tr>
<td>NOT FITTED</td>
<td></td>
</tr>
<tr>
<td>B6-L</td>
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</tbody>
</table>

### Alternatives

### Traction Data for Multiple Units
EMU - INTRODUCED 1967.
Voltage 750/850 Volts D.C. Third Rail

### Basic Type
| EH 276 0A |

### Variants
None
<table>
<thead>
<tr>
<th>BRAKES</th>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tr>
<td>BODY CONSTRUCTION</td>
<td>COMMONWEALTH</td>
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<td>STEEL</td>
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<tr>
<td>TRAIN HEATING</td>
<td>AUTOMATIC SOLID-SHANK (ALLIANCE NO.2)</td>
<td></td>
</tr>
<tr>
<td>MAX. SPEED M.P.H.</td>
<td>ELECTRIC (BR)</td>
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<tr>
<td>MIN. RAD. CURVE CHAINS</td>
<td>90</td>
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<tr>
<td>LIGHTING</td>
<td>3.5</td>
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</tr>
<tr>
<td>TARE WEIGHT TONNES</td>
<td>FLUORESCENT &amp; TUNGSTEN</td>
<td></td>
</tr>
<tr>
<td>GANWAYS</td>
<td>31.5</td>
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<tr>
<td>TRAIN COMMUNICATION</td>
<td>EXPRESS ELECTRIC</td>
<td></td>
</tr>
<tr>
<td>BUFFERS</td>
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</tr>
<tr>
<td>S.R. DESIGN REFERENCE CODE</td>
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</tr>
</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**

**EMU**

- **INTRODUCED AS CLASS 411/2 1958-REFURBISHED AS PROTOTYPE & RECLASSED 1975.**
- **VOLTAGE** 750/850 VOLTS D.C. THIRD RAIL

**BASIC TYPE**

- EH 277 0A

**VARIANTS**

- NONE
## Traction Data for Multiple Units

**Emu - Gatwick Service.** Introduced as Class 423 1967 - Modified & Reclassed 1978.

| Voltage | 750/850 Volts D.C. Third Rail |

### Basic Type

<table>
<thead>
<tr>
<th>Basic Type</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electro Pneumatic</td>
<td>BS (S.R.)</td>
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<tr>
<td>Steel</td>
<td>Automatic Solid Shank (Alliance No. 2)</td>
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<td>3.5</td>
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<td>Express Electric</td>
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<td>Not Fitted</td>
</tr>
<tr>
<td>6q</td>
<td></td>
</tr>
</tbody>
</table>

### Variants

None
**BASIC TYPE**
- ELECTRO PNEUMATIC
- S.R.STANDARD-229X114
- STEEL
- 3 LINK
- ELECTRIC(BR)
- 75
- 3.5
- FLUORESCENT & TUNGSTEN
- 26
- NOT FITTED
- NOT FITTED
- PUBLIC ADDRESS
- CENTRE BOTH ENDS
- DAK 1B
- NON SMOKING

**ALTERNATIVES**

**TRACTION DATA FOR MULTIPLE UNITS**
- EMU-
- VOLTAGE
  - 750/850 VOLTS D.C.THIRD RAIL

**BASIC TYPE**
- EH 279 0A

**VARIANTS**
- OB ALL SMOKING ACCOMMODATION.
### Traction Data for Multiple Units

**EMU**
- Introduced: 1951
- Refurbished: 1979/80
- Reclassed: 1984

**Voltage**
- 750/850 Volts D.C. Third Rail

### Basic Type

<table>
<thead>
<tr>
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<th>ALTERNATIVES</th>
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<tr>
<td>ELECTRO PNEUMATIC</td>
<td>DAK 1B</td>
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<tr>
<td>S.R. STANDARD 229 X 114 STEEL</td>
<td>ALL SMOKING</td>
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<tr>
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<td>NOT FITTED PUBLIC ADDRESS</td>
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<td>CENTRE ONE END-CENTRE WEARING PLATE OTHER END DU</td>
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</table>

### EH 280 0A-Refurbished

- **Basic Type**
  - EH 280 0A-Refurbished

- **Variants**
  - OB Refurbished-All Smoking Accommodation
  - 1B Refurbished-S.R. Design Reference Code DAK 1B
  - 1C Refurbished-S.R. Design Reference DAK 1B, All Smoking Accommodation
TRAILER SECOND

CLASS 415/4

TS

EH 281

13 2730 2438 2730 13

13411 BOGIE CENTRES

18872 OVER HEADSTOCKS

18898 OVER BODY

29 1876 1886 1886 1886 1886 1886 1886 1886 1876 29

SEATS 102
TOILETS -
COMPARTMENTS -
GUARDS COMPARTMENTS -
VENTILATION -
CATERING EQUIPMENT -

ISSUE 7 DATE MAR 86

Original diagrams courtesy of Eddie Knorn. This PDF copy by J.D. Faulkner, 2012 (visit http://www.barrowmoremrg.co.uk)
EH 281

BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max. Speed M.P.H.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers
S.R. Design Reference Code
Smoking Accommodation

BASIC TYPE
Electro Pneumatic
S.R. Standard 229 x 114
Steel
Three Link
Electric (BR)
75
3.5
Fluorescent
27
Not Fitted
Public Address
Centre
DAK 1A
Smoking

ALTERNATIVES
DAN, DAK-2A
Non Smoking

TRACTION DATA FOR MULTIPLE UNITS
Voltage 750/850 Volts D.C. Third Rail

BASIC TYPE
EH 281 OA-Refurbished

VARIANTS
1A S.R. Design Ref. Code DAK-2A.
EH 282

BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max.Speed M.P.H.
Min.Rad.Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers
S.R. Design Reference Code

BASIC TYPE
Electro Pneumatic
Commonwealth
Steel
Automatic Solid Shank (Alliance No.2)
Electric (BR)
90
3.5
Fluorescent & Tungsten
31.5
Express Electric
Public Address
Not Fitted
BZ

ALTERNATIVES
BX, BX 1A, BW 2C

TRACTION DATA FOR MULTIPLE UNITS
EMU-
Voltage
750/850 Volts D.C. Third Rail

BASIC TYPE
EH 202 OA-Refurbished

VARIANTS
1A Refurbished-S.R. Design Reference Code BX,
2A Refurbished-S.R. Design Reference Code BX 1A,
EH 283

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tbody>
<tr>
<td>ELECTRO PNEUMATIC</td>
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<tr>
<td>BS (S.R.)</td>
<td>AUTOMATIC SOLID SHANK (ALLIANCE NO.2)</td>
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<tr>
<td>STEEL</td>
<td>ELECTRIC (GRD)</td>
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<td>90</td>
<td>3.5</td>
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<td>TUNGSTEN</td>
<td>EXPRESS ELECTRIC</td>
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<tr>
<td>31.5</td>
<td>NOT FITTED</td>
</tr>
<tr>
<td>NOT FITTED</td>
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</table>

TRACTION DATA FOR MULTIPLE UNITS

EMU- INTRODUCED 1967.

VOLTAGE 750/850 VOLTS D.C. THIRD RAIL

BASIC TYPE
EH 283 0A

VARIANTS
NONE
**EH 284**

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
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<tr>
<td>ELECTRO PNEUMATIC COMMONWEALTH STEEL AUTOMATIC SOLID SHANK (ALLIANCE NO.2) ELECTRIC (BR) 90 3.5 FLUORESCENT &amp; TUNGSTEN 33.5 EXPRESS ELECTRIC NOT FITTED PUBLIC ADDRESS NOT FITTED Bx4E</td>
<td></td>
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</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**

*EMU-* INTRODUCED 1954 AS MK 1 LOCO-HAULED, REFURBISHED AS CLASS 411/1 & 411/2-1981/2, RECLASSIFIED 411/5 1983

| VOLTAGE | 750/850 VOLTS D.C. THIRD RAIL |

**BASIC TYPE**

EH 284-REFURBISHED

**VARIANTS**

NONE
TRAILER SECOND

CLASS 488/3

TS

EH 285

2667 OVER GUTTERS

3772 OVER VENTS

2743 OVER BODY

2840 OVER HANDLES

14173 BOGIE CENTRES

19526 OVER HEADSTOCKS

2591

LUGGAGE BOX

LUGGAGE SHELVES

1265

1046

LUGGAGE BOX

20117 OVER BODY

20377 OVER GANeways-COUPLED

20463 OVER GANeways-UNCOPPELED

SEATS 56
TOILETS 1
COMPARTMENTS -
GUARDS COMPARTMENTS -
VENTILATION FULL AIR CONDITIONING
CATERING EQUIPMENT -

ISSUE 1
DATE AUG'83
EH 285

<table>
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<th>BASIC TYPE</th>
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<tbody>
<tr>
<td>BRAKES</td>
<td>ELECTRO PNEUMATIC</td>
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<tr>
<td>BOGIE/SUSPENSION</td>
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<td>BODY CONSTRUCTION</td>
<td>84 STEEL</td>
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<tr>
<td>COUPLINGS</td>
<td>BAR ELECTRIC</td>
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<tr>
<td>TRAIN HEATING</td>
<td>BR/FULL AIR CONDITIONING</td>
</tr>
<tr>
<td>MAX SPEED M.P.H.</td>
<td>90 3.5 FLUORESCENT &amp; TUNGSTEN</td>
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<tr>
<td>MIN.RAD.CURVE CHAINS</td>
<td>35 (ESTIMATED)</td>
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<tr>
<td>LIGHTING</td>
<td>PULLMAN</td>
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<tr>
<td>TARE WEIGHT TONNES</td>
<td>PUBLIC ADDRESS</td>
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<td>GANGLWAYS</td>
<td>NOT FITTED</td>
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<tr>
<td>TRAIN COMMUNICATION</td>
<td></td>
</tr>
<tr>
<td>BUFFERS</td>
<td></td>
</tr>
</tbody>
</table>

TRACTION DATA FOR MULTIPLE UNITS

EMU- VICTORIA-GATWICK CONVERTED MK II F TO BE INTRODUCED.

VOLTAGE 750 VOLTS D.C. THIRD RAIL

BASIC TYPE
EH 285 0A

VARIANTS
NONE
BRAKES

Bogie/Suspension

Body Construction

Couplings

Train Heating

E.T.R. Index

Max. Speed M.P.H.

Min. Rad. Curve Metres

Lighting

Tare Weight Tonnes

Gangways

Train Communication

Buffers

BASIC TYPE

Electro-Pneumatic

T3-7 (BREL)

Steel

Bar

Electric (BR) Full Air Conditioning

- 100

90

Fluorescent

34

Centrally supported - Swivelling - Foam Diaphragm - Steel Face Plate

Public Address

Not Fitted

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS

EMU - WATERLOO-BOURNEMOUTH-WEYMOUTH. INTRODUCED 1988

Voltage  750 Volts D.C. Third Rail

BASIC TYPE

EH 288 0A

VARIANTS

None
TRAILER STANDARD WITH WHEELCHAIR POSITION

CLASS 442
TS(B)
EH 289

23000 OVER GANGWAY (COUPLED)

3075
1040
16000 BOGIE CENTRES
22150 OVER HEADSTOCKS
3075

2740 AT WAIST

22570 OVER BODY END DATE

1065 1510
- 150
- 150
1415 1160

2575
18375 BETWEEN PARTITIONS

SEATS 78
TOILETS 2
COMPARTMENTS -
GUARDS COMPARTMENTS -
VENTILATION FULL AIR CONDITIONING
CATERING EQUIPMENT -

ISSUE 1
DATE JUL 88
EH 289

<table>
<thead>
<tr>
<th>BRAKES</th>
<th>ELECTRO-PNEUMATIC</th>
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</thead>
<tbody>
<tr>
<td>BOGIE/SUSPENSION</td>
<td>T3-T (BREL)</td>
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<tr>
<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
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<tr>
<td>COUPLINGS</td>
<td>BAR</td>
</tr>
<tr>
<td>TRAIN HEATING</td>
<td>ELECTRIC(BR) FULL AIR CONDITIONING</td>
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<tr>
<td>MAX SPEED M.P.H.</td>
<td>100</td>
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<tr>
<td>MIN RAD CURVE METRES</td>
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<tr>
<td>LIGHTING</td>
<td>FLUORESCENT</td>
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<tr>
<td>TARE WEIGHT TONNES</td>
<td>34</td>
</tr>
<tr>
<td>GANGWAYS</td>
<td>CENTRALLY SUPPORTED-SWIVELLING-FLE DIAPHRAGM-STEEL FACE PLATE</td>
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<tr>
<td>BUFFERS</td>
<td>NOT FITTED</td>
</tr>
<tr>
<td>TRAIN COMMUNICATION</td>
<td>PUBLIC ADDRESS</td>
</tr>
</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**

EMU: WATERLOO-BOURNEMOUTH-WEYMOUTH. INTRODUCED 1988

VOLTAGE: 750 VOLTS D.C. THIRD RAIL

**BASIC TYPE**

EH 289

**VARIANTS**

NONE
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tbody>
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<td>BRAKES</td>
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<td>Couplings</td>
<td>BAR</td>
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<tr>
<td>Train Heating</td>
<td>ELECTRIC (BR) FULL AIR CONDITIONING</td>
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<td>max Speed M.P.H.</td>
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</tr>
<tr>
<td>Min. Rad. Curve Chains</td>
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<tr>
<td>Lighting</td>
<td>FLUORESCENT &amp; TUNGSTEN</td>
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<tr>
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<tr>
<td>Gangways</td>
<td>Pullman</td>
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<td>Train Communication</td>
<td>Public Address</td>
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<tr>
<td>Buffers</td>
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</tbody>
</table>

**Traction Data for Multiple Units**


| Voltage               | 750 Volts D.C. THIRD RAIL          |

**Basic Type**

EH 290 OA

**VARIANTS**

NONE
EH 302

**BRAKES**
- BOGIE/SUSPENSION
- BODY CONSTRUCTION
- COUPLINGS
- TRAIN HEATING
- MAX SPEED M.P.H.
- MIN RADIUS CURVE CHAINS
- LIGHTING
- TARE WEIGHT TONNES
- GANGWAYS
- TRAIN COMMUNICATION
- BUFFERS

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tbody>
<tr>
<td>ELECTRO PNEUMATIC</td>
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<td>GRESLEY ET2</td>
<td>B4</td>
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<td>AUTOMATIC SOLID SHANK (ALLIANCE No.2)</td>
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<td>75</td>
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<td>TUNGSTEN</td>
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<tr>
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</tr>
<tr>
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</tbody>
</table>

**TRACTION DATA FOR MULTIPLE UNITS**

EMI-
- Fenchurch St. - Shoebury
- Introduced 1958

**VOLTAGE**
- 25 & 6.25 KV A.C. OVERHEAD

**BASIC TYPE**

EH 302 OA

**VARIANTS**

0B 54 BOGIES.
### EH 303

<table>
<thead>
<tr>
<th>BRAKES</th>
<th>ELECTRO PNEUMATIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOGIE/SUSPENSION</td>
<td>GRESLEY 6T8</td>
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<td>BODY CONSTRUCTION</td>
<td>STEEL</td>
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<tr>
<td>COUPLINGS</td>
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<tr>
<td>MAX. SPEED N.P.H.</td>
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<tr>
<td>MIN. RAD. CURVE CHAINS</td>
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<tr>
<td>BUFFERS</td>
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**TRACTION DATA FOR MULTIPLE UNITS**


- VOLTAGE - 25 KV A.C. OVERHEAD

**BASIC TYPE**

- EH 303 OA

**VARIANTS**

- NONE
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<td>BRAKES</td>
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<td>Bogie/Suspension</td>
<td>GRESLEY ETO</td>
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<td>Couplings</td>
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<td>Tare Weight Tonnes</td>
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<tr>
<td>Buffers</td>
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</table>

**TRACTION DATA FOR MULTIPLE UNITS**


**VOLTAGE** 25 KV A.C. OVERHEAD

**BASIC TYPE**

EH 304 OA

**VARIANTS**

NONE
EH 307

<table>
<thead>
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<th>BRAKES</th>
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<td>BAR</td>
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<td>MIN.RAD.CURVE CHAINS</td>
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</table>

TRACTION DATA FOR MULTIPLE UNITS

EMU- ST.PANCAS & MOORGATE-BEDFORD, TRANSFERED TO E.R. OR W.C.M.L.

VOLTAGE 25 KV A.C.OVERHEAD

BASIC TYPE

EH 307 0A

VARIANTS

NO SMOKING/NO SMOKING AREAS REVERSED IN CENTRE BAYS.
### BRAKES
- ELECTRO-PNEUMATIC
- BI13a & BI13b (ONE OF EACH)
- STEEL
- AUTOMATIC TIGHTLOCK OUTER END BAR INNER END ELECTRIC (BR)
  - 90
  - 3.5
- FLUORESCENT & TUNGSTEN
  - 28.5
- CENTRALLY SUPPORTED-SWIVELLING-FLEXIBLE DIAPHRAGM-STEEL FACE PLATE OUTER END-FLEXIBLE DIAPHRAGM/RIGID (GRP) INNER END FITTED
- DRIVER/SIGNAL BOX-DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER NOT FITTED

### Traction Data for Multiple Units
- **EMU**
  - GREAT NORTHERN OUTER SUBURBAN
- **VOLTAGE**
  - 25 KV A.C. OVERHEAD

### Basic Type
- **EH 308 OA**

### Alternatives

### Variants
- 08 SMOKING/NO SMOKING AREAS REVERSED IN CENTRE BAYS.
TRAILER COMPOSITE

CLASS 309/1

TC

EH 309

19329 OVER HEADSTOCKS

14173 BOGIE CENTRES

1295

1295

2667 OVER GUTTERS

3899 OVERALL

3772 OVER ROOF

3175 OVER GUTTER

3664 OVER VENTS

2312

OVER BODY END STEPBOARDS

2743

OVER BODY & STEPBOARDS

2819

OVERALL

9693

1067

2184

994

787

6852

994

19660 OVER BODY

20180 OVER GANGWAYS-COUPLED

20282 OVER GANGWAYS-UNCOPLED

SEATS 28

TOILETS 1

COMPARTMENTS 4

GUARDS COMPARTMENTS -

VENTILATION -

CATERING EQUIPMENT -

ISSUE DATE

2 MAR 87

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EH 309

BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
TRAIN COMMUNICATION
BUFFERS

BASIC TYPE

ELECTRO PNEUMATIC
COMMONWEALTH
STEEL
AUTOMATIC SOLID SHANK (ALLIANCE NO. 2)
ELECTRIC (BR)
100
3.5
FLOURESCENT & TUNGSTEN
36
PULLMAN
PUBLIC ADDRESS
NOT FITTED

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS

VOLTAGE 25 & 6.25 KV A.C. OVERHEAD.

BASIC TYPE
EH 309 0A

VARIANTS
NONE
EH 360

BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX.SPEED M.P.H.
MIN.RAD.CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
TRAIN COMMUNICATION
BUFFERS
S.R.DESIGN REFERENCE CODE

BASIC TYPE
ELECTRO PNEUMATIC
S.R.MK 4 UNPOWERED
STEEL
AUTOMATIC SOLID SHANK (ALLIANCE NO.2)
ELECTRIC (BR)
90
3.5
TUNGSTEN
31.5
EXPRESS ELECTRIC
PUBLIC ADDRESS
NOT FITTED
BF

ALTERNATIVES
COMMONWEALTH

TRACTION DATA FOR MULTIPLE UNITS
EMU-
INTRODUCED 1956.
VOLTAGE
750/850 VOLTS D.C. THIRD RAIL

BASIC TYPE
EH 360 0A

VARIANTS
OB COMMONWEALTH BOGIES.
EH 361

BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max. Speed M.P.H.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers
S.R. Design Reference Code

BASIC TYPE
Electro Pneumatic
S.R. Mk 4 Unpowered
Steel
Automatic Solid Shank (Alliance No. 2)
Electric (GR)
90
3.5
Tungsten
31.5
Express Electric
Public Address
Not Fitted
BJ

ALTERNATIVES

Commonwealth
BM, BM 1A

TRACTION DATA FOR MULTIPLE UNITS

EMU -
Introduced-Class 410/2 1959-Class 411/2 1958.
Voltage
750/850 Volts D.C. Third Rail

BASIC TYPE
EH 361 0A

VARIANTS

1B Commonwealth bogies, S.R. Design Reference Code BM.
2C Commonwealth bogies, S.R. Design Reference Code BM 1A.
<table>
<thead>
<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<tr>
<td>BRAKES</td>
<td>ELECTRO PNEUMATIC</td>
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<tr>
<td>BOGIE/SUSPENSION</td>
<td>BX1/Pa &amp; BX1/Pb (ONE OF EACH)</td>
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<td>BODY CONSTRUCTION</td>
<td>STEEL UNDERFRAME &amp; BODY FRAMING-ALUMINIUM BODY &amp; ROOF</td>
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<td>COUPLINGS</td>
<td>AUTOMATIC TIGHTLOCK OUTER END-BAR INNER END</td>
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<td>TRAIN HEATING</td>
<td>WASTE HEAT RECOVERY-DUCTED VARM AIR</td>
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<td>FLUORESCENT &amp; TUNGSTEN</td>
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<td>BUFFERS</td>
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**TRACTION DATA FOR MULTIPLE UNITS**

EMU - GREAT NORTHERN INNER SUBURBAN. INTRODUCED 1976.

- VOLTAGE 25 KV A.C. OVERHEAD & 750 VOLTS D.C. THIRD RAIL
- TRACTION MOTORS 4 X 110 HP GEC G310A2

<table>
<thead>
<tr>
<th>BASIC TYPE</th>
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<tr>
<td>EI 201 OA</td>
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<table>
<thead>
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<th>VARIANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NONE</td>
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</table>
## BASIC TYPE

**EI 202**

**ALTERNATIVES**

- ELECTRO PNEUMATIC
  - $B_1/P_e$ & $B_1/P_g$ (one of each)
- STEEL UNDERFRAME & BODY FRAMING - ALUMINIUM BODY & ROOF
- AUTOMATIC TIGHTLOCK OUTER END - BAR INNER END
- ELECTRIC-DUCTED VAVH AIR
  - 75
- 3.5
- FLUORESCENT & TUNGSTEN
  - 37
- FLEXIBLE DIAPHRAGM/ RIGID (GRP) INNER END
- FITTED
  - DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER
  - NOT FITTED

## TRACTION DATA FOR MULTIPLE UNITS

**EMU**

- CARSTON - LIVERPOOL - SOUTHPORT

**INTRODUCED 1979.**

**VOLTAGE**

- 600/750 VOLTS D.C. THIRD RAIL

**TRACTION MOTORS**

- 4 x 110 HP GEC G310AZ

## BASIC TYPE

**EI 202 0A**

## VARIANTS

- NONE
BATTERY DRIVING MOTOR SECOND

CLASS 508

BDMS

EI 203

14170 BOGIE CENTRES
19330 OVER HEADSTOCKS
20179 COUPLED
20866 UNCOUPLED
19800 OVER BODY

2820 OVER BODY

1146

2586 OVER STEPS

2734 OVER TREADPLATES

3582

5120 1600 5120 1600 3370 1180 1440

28 SEATS 28 SEATS 10 SEATS

NO-SMOKING NO-SMOKING NO-SMOKING

1288 THROUGHWAY 1288 THROUGHWAY 638 THROUGHWAY

SEATS 74
TOILETS 1
COMPARTMENTS -
GUARDS COMPARTMENTS CAB WHEN TRAILING
VENTILATION -
CATERING EQUIPMENT -

ISSUE 3  DATE Aug '82

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<td>BX1/P &amp; BX1/P (ONE OF EACH)</td>
<td>AUTOMATIC TIGHTLOCK OUTER END-BAR INNER END</td>
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<td>ELECTRIC-DUCTED VARM AIR</td>
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<td>3.5</td>
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**TRACTION DATA FOR MULTIPLE UNITS**

EMU- INTRODUCED 1980.

VOLTAGE 750/850 VOLTS D.C. THIRD RAIL

TRACTION MOTORS 4 X 110 HP GEC G310AZ OR BRUSH TM 61-53 -INTERCHANGEABLE.
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<tr>
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<td>AUTOMATIC SOLID SHANK(ALLIANCE NO 2)</td>
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<tr>
<td></td>
<td>ELECTRIC(BR)</td>
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<tr>
<td></td>
<td>90</td>
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<tr>
<td></td>
<td>3.5</td>
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<tr>
<td></td>
<td>TUNGSTEN</td>
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<tr>
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</tr>
<tr>
<td></td>
<td>NOT FITTED</td>
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<tr>
<td></td>
<td>BR</td>
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<tbody>
<tr>
<td>BR 1A</td>
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**TRACTION DATA FOR MULTIPLE UNITS**

EMU-

- VOLTAGE 750/850 VOLTS D.C. THIRD RAIL

**BASIC TYPE**

EJ 160 OA

**VARIANTS**

18 S.R. DESIGN REFERENCE CODE BR 1A.
BASIC TYPE

EJ 260 (A)

ALTERNATIVES

ELECTRO PNEUMATIC
BS(5.0)
STEEL
AUTOMATIC SOLID SHANK (ALLIANCE NO.2)
RITICAL (4K)
90
3.5
TUNGSTEN
35.5
EXPRESS ELECTRIC
DRIVER/GUARD & PUBLIC ADDRESS WITH TRANSMITTER
NOT FITTED
BT

BT 1A

TRACTION DATA FOR MULTIPLE UNITS

EMU-
VOLTAGE 750/850 VOLTS D.C., THIRD RAIL

BASIC TYPE

EJ 260 OA

VARIANTS

8 X S.R. DESIGN REF. CODE BT 1A.
BASIC TYPE
ELECTRO PNEUMATIC
COMMONWEALTH
STEEL
AUTOMATIC SOLID SHANK (ALLIANCE NO 2)
ELECTRIC (BR)
90
3.5
FLUORESCENT & TUNGSTEN
31.5
EXPRESS ELECTRIC
DRIVER/GUARD-PUBLIC ADDRESS
NOT FITTED
BW

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS
EMU-
VOLTAGE 750/850 VOLTS D.C. THIRD RAIL

BASIC TYPE
EJ 360 DA

VARIANTS
NONE
TRAILER BRAKE COMPOSITE

CLASS 412
411/5

TBC

EJ 361

14173 Bogie Centres
19330 Over Headstocks
20339 Over Couplers-Raised

19660 Over Body

OVER GUTTERS
OVER ROOF
OVER GUARDS STEPS
OVER BODY & STEPS
OVER VENTS
OVER STEPSBOARDS
OVER GUARDS STEPS

2591
483
76
921 1067 1305 2407 2184 2184 2184 2184 1067 921

SEATS
TOILETS
COMPARTMENTS
GUARDS COMPARTMENTS
VENTILATION
CATERING EQUIPMENT

24 FIRST CLASS & SECOND CLASS
2 FIRST CLASS 1 SECOND CLASS

ORIGINAL DIAGRAMS FOR REFERENCE:
BR 922

ISSUE 6
DATE NOV 84

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<td>BRAKES</td>
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<td>COUPLINGS</td>
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<tr>
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<td>Tungsten</td>
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<tr>
<td>TARE WEIGHT TONNES</td>
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<tr>
<td>GANGWAYS</td>
<td>EXPRESS ELECTRIC</td>
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<tr>
<td>TRAIN COMMUNICATION</td>
<td>DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER</td>
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<tr>
<td>BUFFERS</td>
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<td>BY</td>
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**TRACTION DATA FOR MULTIPLE UNITS**

EMU-

VOLTAGE 750/850 VOLTS D.C. THIRD RAIL

**BASIC TYPE**

EJ 361 DA-REFURBISHED

**VARIANTS**

1. A REFURBISHED-S.R. DESIGN REFERENCE CODE BW.
2. 2A REFURBISHED-S.R. DESIGN REFERENCE CODE BW 1A.
3. 3A REFURBISHED-S.R. DESIGN REFERENCE CODE BN 1B.
TRAILER BUFFET SECOND

CLASS 422/1
422/2

TRBS
EN 260

44' 4" BOGIE CENTRES
63' 5" OVER HEADSTOCKS
46' 3" COUPLED
46' 9" UNCOUPLED (OVER COUPLERS)

FOOD DISPLAY
DRESSED
BAKE CABINETS
COUNTER
FRIG

CATERING EQUIPMENT
ELECTRIC

ALL WINDOWS ARE DOUBLE GLAZED

SEATS
40

TOILETS
-

COMPARTMENTS
-

GUARDS COMPARTMENTS
-

VENTILATION
-

ORIGINAL DIAGRAMS FOR REFERENCE:-
BR 427

ISSUE
3

DATE
JAN 84
EN 260

BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX.SPEED M.P.H.
MIN.RAD.CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
TRAIN COMMUNICATION
BUFFERS
S.R.DESIGN REFERENCE CODE

BASIC TYPE
ELECTRO PNEUMATIC
BS(S.R.)
STEEL
AUTOMATIC SOLID SHANK (ALLIANCE NO 2)
ELECTRIC (BR)
90
3.5
TUNGSTEN
35
EXPRESS ELECTRIC
NOT FITTED
NOT FITTED
BP

ALTERNATIVES
FLUORESCENT & TUNGSTEN
BP 1A

TRACTION DATA FOR MULTIPLE UNITS
EMU-
VOLTAGE
750/650 VOLTS D.C. THIRD RAIL

BASIC TYPE
EN 260 OA

VARIANTS
1B FLUORESCENT & TUNGSTEN LIGHTING, S.R.DESIGN REF.CODE BP 1A.
TRAILER BUFFET SECOND

CLASS 412

TRB

EN 261

14173 BOGIE CENTRES
19330 OVER HEADSTOCKS
20339 OVER COUPLERS-RAISED

19660 OVER BODY

2591

2591

483

SEATS
33

TOILETS
1

COMPARTMENTS
-

GUARDS COMPARTMENTS
-

VENTILATION
-

CATERING EQUIPMENT
ELECTRIC

OVER GUTTERS 2667
OVER BODY & STEPBOARDS 2743
OVER BODY & STEPBOARDS 2819
OVERALL 3834

OVER GUTTERS 3899
OVER HEADSTOCKS 3772
OVER ROOF 3175

OVER VENTS 1143

2286

OVER BODY 2286

3899 OVERALL

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<th>BRAKES</th>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<td>FLUORESCENT &amp; TUNGSTEN</td>
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<td>PUBLIC ADDRESS WITH TRANSMITTER</td>
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**TRACTION DATA FOR MULTIPLE UNITS**


VOLTAGE: 750/650 VOLTS D.C. THIRD RAIL

**BASIC TYPE**

EN 261 0A

**VARIANTS**

NONE
BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max. Speed M.P.H.
Min. Rad. Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers
S.R. Design Reference Code

BASIC TYPE
EN 460 OA

ALTERNATIVES

ELECTRO PNEUMATIC
COMMONWEALTH
STEEL
AUTOMATIC SOLID SHANK (ALLIANCE NO 2)
ELECTRIC (GR)
90
3.5
TUNGSTEN
35.5
EXPRESS ELECTRIC
NOT FITTED
NOT FITTED
BG

TRACTION DATA FOR MULTIPLE UNITS

EN460 INTRODUCED 1956.

VOLTS
750/650 VOLTS D.C. THIRD RAIL

VARIANTS
NONE
EN 461

BASIC TYPE

ALTERNATIVES

BRAKES
ELECTRO PNEUMATIC
BOGIE/SUSPENSION COMMONWEALTH
BODY CONSTRUCTION STEEL
COUPLINGS AUTOMATIC SOLID SHANK (ALLIANCE NO.2)
TRAIN HEATING ELECTRIC (BR)
GREASE 90
MAX.SPEED M.P.H. 3.5
MIN.RAD CURVE CHAINS ELECTRIC
LIGHTING 35.5
TARE WEIGHT TØNNES EXPRESS ELECTRIC
GANGWAYS NOT FITTED
TRAIN COMMUNICATION NOT FITTED
BUFFERS BL
S.R.DESIGN REFERENCE CODE BL 1A, BL 2B

TRACTION DATA FOR MULTIPLE UNITS

EMU- INTRODUCED 1959.
VOLTAGE 750/850 VOLTS D.C. THIRD RAIL

BASIC TYPE
EN 461 0A

VARIANTS

1B S.R.DESIGN REFERENCE CODE BL 1A.
2C S.R.DESIGN REFERENCE CODE BL 2B.
<table>
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<tr>
<th>BASIC TYPE</th>
<th>ALTERNATIVES</th>
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<td>BS(S.R.)</td>
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**TRACTION DATA FOR MULTIPLE UNITS**

EMU-

- VOLTAGE 750/850 VOLTS D.C. THIRD RAIL

**BASIC TYPE**

EN 462 0A

**VARIANTS**

NONE
EN 463

BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
TRAIN COMMUNICATION
BUFFERS
S.R. DESIGN REFERENCE CODE

BASIC TYPE
ELECTRO PNEUMATIC
BS(S.R.)
STEEL
AUTOMATIC SOLID SHANK (ALLIANCE NO. 2)
ELECTRIC (BR)
90
3.5
TUNGSTEN
35
EXPRESS ELECTRIC
NOT FITTED
NOT FITTED
BS 1A

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS
EMU-
VOLTAGE
750/850 VOLTS D.C. THIRD RAIL

BASIC TYPE
EN 463 0A

VARIANTS
NONE
**BRAKES**
- BOGIE/SUSPENSION
- BODY CONSTRUCTION
- COUPLINGS

**TRAIN HEATING**
- MAX. SPEED M.P.H.
- MIN. RAD. CURVE CHAINS
- LIGHTING
- TARE WEIGHT TONNES
- GANGWAYS
- A.W.S.
- TRAIN COMMUNICATION
- BUFFERS

---

**BASIC TYPE**

**ALTERNATIVES**
- ELECTRO PNEUMATIC
- ET7
- STEEL
- AUTOMATIC DROPHEAD (BUCKEYE) OUTER END - AUTOMATIC SOLID SHANK (BUCKEYE) INNER END
- ELECTRIC (BR)
- 75
- 3.5
- FLUORESCENT
- 43
- PULLMAN WITH RIGID (GRP) INNER PANELS INNER END ONLY
- FITTED
- DRIVER/GUARD-PUBLIC ADDRESS WITH TRANSMITTER
- RETRACTABLE SPINDLE - 559 X 356 OVAL OUTER END CENTRE INNER END

---

**TRACTION DATA FOR MULTIPLE UNITS**


25 & 6.25 KV A.C. OVERHEAD

---

**BASIC TYPE**

**EO 202 0A**

**VARIANTS**

OB B5 BOGIES.
TRAILER FIRST HANDBRAKE

CLASS 488/2

TFH

EP 101

SEATS 41
TOILETS 1
COMPARTMENTS -
GUARDS COMPARTMENTS -
VENTILATION FULL AIR CONDITIONING
CATERING EQUIPMENT -

14173 BOGIE CENTRES
19826 OVER HEADSTOCKS

2667 OVER GUTTERS
3772 OVER VENTS

2743 OVER BODY
2840 OVER HANDLES

HAND BRAKE CUPBOARD & PAY PHONE
SPACE FOR WHEELCHAIR PASSENGER
LUGGAGE BOX
SMOKING NON SMOKING
TOILET

LUGGAGE BOX
1265 1046 2238 2203 2203 2191 2191 2203 2238 1161 1130

2017 OVER BODY
20377 OVER GAN GWAYS-COUPLED
20453 OVER GAN GWAYS-UNCOPLED

ISSUE DATE
2 JUN 86

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BASIC TYPE

EP 101 OA

VARIANTS

IA PUBLIC ADDRESS & PAY PHONE.

ALTERNATIVES

PUBLIC ADDRESS & PAY PHONE

TRACTION DATA FOR MULTIPLE UNITS

VOLTAGE 750 VOLTS D.C. THIRD RAIL

BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max Speed M.P.H.
Min Radius Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers

ELECTRO-PNEUMATIC
84
SteeL Automatic Drophead(Buckeye) Outer End-Bar Inner End
Electric/Brf Full Air Conditioning
90
3.5
Fluorescent & Tungsten
35(Estimated)
Pullman
Public Address
Retractable Spindle (159)x356 Oval) Outer End Only
BRAKES
BODGE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX SPEED M.P.H.
MIN/RAD/CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
TRAIN COMMUNICATION
BUFFERS

BASIC TYPE

ELECTRO PNEUMATIC
B4
STEEL
AUTOMATIC DROPHEAD (BUCKEYE) OUTER END-BAR INNER END
ELECTRIC (BF/FULL AIR CONDITIONING
90
3.5
FLUORESCENT & TUNGSTEN
35 (ESTIMATED)
PULLMAN
PUBLIC ADDRESS
RETRACTABLE SPINDLE (559X356 OVAL) OUTER END ONLY

TRACTION DATA FOR MULTIPLE UNITS

EMU-
VICTORIA-GATWICK CONVERTED MK II F TO BE INTRODUCED
VOLTAGE 750 VOLTS D.C. THIRD RAIL

BASIC TYPE

EP 201 DA

VARIANTS

NONE
BRAKES
Bogie/Suspension
Body Construction
Couplings
Train Heating
Max Speed M.P.H.
Min Radius Curve Chains
Lighting
Tare Weight Tonnes
Gangways
Train Communication
Buffers

BASIC TYPE

Electro Pneumatic
84
Steel
Automatic Drophead
Duckeye Outer End-Bar Inner End
Electric/Brifull Air Conditioning
90
3.5
Fluorescent & Tungsten
35 (Estimated)
Pullman
Public Address
Retractable Spindle (559x356 Oval) Outer End Only

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS

EMU: Victoria-Gatwick Converted MK IIIF Introduced 1984
Voltage: 750 Volts D.C. Third Rail

BASIC TYPE

EP 202 0A

VARIANTS

NONE
DRIVING TRAILER LUGGAGE VAN

SEATS
TOILETS
COMPARTMENTS
GUARDS COMPARTMENTS
VENTILATION
CATERING EQUIPMENT

CLASS 308/2
DTLV
EW 501

19523 OVER BODY

19329 OVER HEADSTOCKS
20358 OVER BUFFERS WHEN EXTENDED

14173 BOGIE CENTRES

1295

3772 OVER ROOF

3861 OVERALL

2743 OVER BODY & STEPBOARDS
2819 OVERALL

1308 816

20180 OVER CENTRE BUFFERS (COUPLED)
20282 OVER CENTRE BUFFERS (UNCOPLED)

ISSUE 1 DATE MAY 84

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EW 501

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<td>GRESLEY ET8</td>
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<td>STEEL</td>
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<td>ALLIANCE NO. 2 INNER END</td>
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<td>75</td>
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<td>3.5</td>
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<td>TUNGSTEN</td>
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<td>GANGWAYS</td>
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<tr>
<td>A.W.S.</td>
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<td>BUFFERS</td>
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<td>LIVERPOOL ST.- ENFIELD &amp; CHINGFORD.</td>
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<td>VOLTAGE</td>
</tr>
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<td>25 &amp; 6.25 KV A.C. OVERHEAD</td>
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<th>VARIANTS</th>
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EX 560

BASIC TYPE
EX 560 0A

VARIANTS
18 S.R. DESIGN REFERENCE CODE AF 1A.

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS
EMU- INTRODUCED 1957.

VOLTAGE 750/850 VOLTS D.C.

TRACTION MOTORS 2 X 250 HP ENGLISH ELECTRIC
### Traction Data for Multiple Units

<table>
<thead>
<tr>
<th>EMU-</th>
<th>Victoria-Gatwick Converted Class 414/3</th>
<th>To Be Introduced</th>
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<td>750 Volts D.C. Third Rail</td>
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<tr>
<td>Traction Motors</td>
<td>2 x 250 HP English Electric</td>
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### Basic Type

| EX 561 0A |

### Alternatives

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<td>Electro Pneumatic</td>
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<tr>
<td>SR Mk4 Powered &amp; Unpowered (one of each)</td>
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<td>Steel</td>
</tr>
<tr>
<td>Automatic Drophead (Buckeye)</td>
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<tr>
<td>Electric (BR)</td>
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<tr>
<td>90</td>
</tr>
<tr>
<td>3.5</td>
</tr>
<tr>
<td>Tungsten</td>
</tr>
<tr>
<td>4.5 (Estimated)</td>
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<tr>
<td>Pullman with Rigid GRP Inner Panels</td>
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<tr>
<td>Public Address</td>
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<tr>
<td>Retractable Spindle (559x356 Oval)</td>
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### Variants

| None |
### BASIC TYPE

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<td>GRESLEY EBD</td>
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<td>STEEL</td>
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<tr>
<td>Couplings</td>
<td>AUTOMATIC SOLID SHANK (ALLIANCE NO.2)</td>
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<td>ELECTRIC (BR)</td>
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<td>Min. Rad. Curve Chains</td>
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<tr>
<td>Lighting</td>
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<tr>
<td>Train Communication</td>
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<tr>
<td>Buffers</td>
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</table>

### ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS

EMU-
Fenchurch St.-Shoeburyness, INTRODUCED 1961.

- Voltage: 25 & 6.25 KV A.C. OVERHEAD
- Traction Motors: 4 x 192 HP D.C. ENGLISH ELECTRIC

### BASIC TYPE

| BASIC TYPE | EY 501 OA |

### VARIANTS

- NONE
LC 501

**BRAKES**
- BOGIE/SUSPENSION
- BODY CONSTRUCTION
- COUPLINGS
- TRAIN HEATING
- MAX. SPEED K.P.M.
- MIN. RAD. CURVE CHAINS
- LIGHTING
- TARE WEIGHT TONNES
- GANDWAYS
- TRAIN COMMUNICATION
- BUFFERS

**BASIC TYPE**
- ELECTRONIC CONTROL (APT)
- BPI7 & BPI7a (ONE OF EACH)
- STEEL WITH STEEL/ALUMINIUM ROOF
- AUTOMATIC TIGHTLOCK
  - 125
  - 4.5
- FLUORESCENT
- 47.5
- APT POWER CAR TYPE-BOTH ENDS
- DRIVER/GUARD
- NOT FITTED

**ALTERNATIVES**

---

**TRACTION DATA FOR MULTIPLE UNITS**

APT PROTOTYPE  INTRODUCED 1980.

- VOLTAGE  25 KV A.C. OVERHEAD
- TRACTION MOTORS  4 X 1000 HP CONTINUOUS RATING-ASEA LJMA 410 F.

**BASIC TYPE**

LC 501 DA

**VARIANTS**

NONE
<table>
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<th>ALTERNATIVES</th>
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<td>LE 201 OA</td>
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**TRACTION DATA FOR MULTIPLE UNITS**

- **APT Prototype**
  - Introduced 1980.

- **Voltage**
  - 25 KV A.C. OVERHEAD
TRAILER FIRST-APT

CLASS 370
TF
LH 101

1750
15900 AIR SPRING CENTRES
3500
2720 OVERALL
3510 OVERALL HEIGHT

21000 OVER GANGWAYS (COUPLED)

SEATS
TOILETS
COMPARTMENTS
GUARDS COMPARTMENTS
VENTILATION
CATERING EQUIPMENT

47
2
-
-
FULL AIR CONDITIONING

ORIGINAL DIAGRAMS FOR REFERENCE:
BR 931

ISSUE 2
DATE AUG 81

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BRAKES
RODGE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT TONNES
GANGWAYS
TRAIN COMMUNICATION
BUFFERS

**BASIC TYPE**

- ELECTRONIC CONTROL (APT)
- BT11 (ARTICULATED)
- ALUMINIUM
- BAR
- ELECTRIC (BR) FULL AIR CONDITIONING
- 125
- 4.5
- FLUORESCENT & TUNGSTEN
- 24
- APT TRAILER CAR TYPE-80TH ENDS
- PUBLIC ADDRESS
- NOT FITTED

**ALTERNATIVES**

**TRACTION DATA FOR MULTIPLE UNITS**

- APT PROTOTYPE INTRODUCED 1980.
- VOLTAGE 25 KV A.C. OVERHEAD

**BASIC TYPE**

- LH 101 DA

**VARIANTS**

- NONE
BRAKES
BOGIE/SUSPENSION
BODY CONSTRUCTION
COUPLINGS
TRAIN HEATING
MAX. SPEED M.P.H.
MIN. RAD. CURVE CHAINS
LIGHTING
TARE WEIGHT Tonnnes
CANGWAYS
TRAIN COMMUNICATION
BUFFERS

BASIC TYPE
ELECTRONIC CONTROL (APT)
BT11 (ARTICULATED) & BT11a (ARTICULATED) (ONE OF EACH)
ALUMINIUM
BAR
ELECTRIC (BR) FULL AIR CONDITIONING
125
4.5
FLUORESCENT
24
APT TRAILER CAR TYPE - BOTH ENDS
PUBLIC ADDRESS
NOT FITTED

ALTERNATIVES

TRACTION DATA FOR MULTIPLE UNITS

APT PROTOTYPE INTRODUCED 1980.
VOLTAGE 25 KV A.C. OVERHEAD

BASIC TYPE
LH 201 DA

VARIANTS
NONE
### LH 401

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<th>Brakes</th>
<th>Basic Type</th>
<th>Alternatives</th>
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<td>Bar</td>
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<td>Tare Weight Tonnes</td>
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<td>Gangways</td>
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<td>Train Communication</td>
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<td>Buffers</td>
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### Traction Data for Multiple Units

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### Basic Type

LH 401 0A

### Variants

None
**BASIC TYPE**

- ELECTRONIC CONTROL (APT)
- BT11 (ARTICULATED) & BT12a (ONE OF EACH)
- ALUMINIUM BAR
- ELECTRIC (BR) FULL AIR CONDITIONING
- 125
- 4.5
- FLUORESCENT & TUNGSTEN
- 33
- APT POWER CAR TYPE ONE END-TRAILER CAR TYPE OTHER END
- DRIVER/GUARD & PUBLIC ADDRESS WITH TRANSMITTER NOT FITTED

---

**TRACTION DATA FOR MULTIPLE UNITS**

APT PROTOTYPE INTRODUCED 1980.

VOLTAGE 25 KV A.C. OVERHEAD

---

**BASIC TYPE**

LJ 101 OA

---

**VARIANTS**

NONE
**BRAKES**

**Bogie/Suspension**

**Body Construction**

**Couplings**

**Train Heating**

**Max. Speed A.P.H.**

**Min. Radii, Curve Chains**

**Lighting**

**Tare Weight Tonnes**

**Gangways**

**Train Communication**

**Suffers**

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**TRACTION DATA FOR MULTIPLE UNITS**


**BASIC TYPE**

LK 201 OA

**VARIANTS**

NONE
**VEHICLE DIAGRAM BOOK**

NO. 210

FOR ELECTRICAL MULTIPLE UNITS

REVISION LETTER NO. 16

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<td>Insert new diagrams EB 281, EC 210, ED 219, 265, EE 160, 236, 237, 273, 274, 308, EH 232, 235, EH 288 and 289</td>
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<td>Diagrams EB 268, EC 208, EE 217, 231, 262, 263, 265, 270 and EH 233</td>
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DATE: JANUARY 1989

REF: 171-125-2

Issue by:-

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Railway Technical Centre
Derby

2305/4278g/2

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VEHICLE DIAGRAM BOOK
NO. 210
FOR ELECTRIC MULTIPLE UNIT
REVISION LETTER NO. 15

LOCATION
Index of EMU Vehicle Numbers to Design Code, pages 1 to 33

ACTION
Remove and destroy

REASON FOR CHANGE
Out of date
For up-to-date information contact Rolling Stock Library, Trent House, RTC.

Diagrams EA 207, )
EC 203, 206, EE 209, )
EF 208, EH 217, 222, )
and 223 )

Replace with )
latest issue of)
these diagrams )

In alpha/numerical order
Insert new diagrams
EC 209, EE 233, 234,
EH 234, 290, and
EP 202

Diagrams up-dated
First issue

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Date : JUNE 1988
Ref : 171-125-2
Tel : 056-3582

2310/9580h/2

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**NO. 210**

**FOR ELECTRIC MULTIPLE UNITS**

**REVISION LETTER NO. 14**

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**Date:** September 1987

**Ref:** 171-125-2

**Tel:** 056-3582

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VEHICLE DIAGRAM BOOK
NO.210
FOR ELECTRIC MULTIPLE UNITS
REVISION LETTER NO.13

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Date: February 1987
Ref: 171-125-2
Tel: 056 3582

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**NO 210**

**FOR ELECTRIC MULTIPLE UNITS**

**(INCLUDING APT)**

**REVISION LETTER NO 12**

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<td>First Issue</td>
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After incorporating the above, endorse the "Revision Record" at the front of the manual accordingly.

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**DATE:** JULY 1986

**REF:** 171-125-2

**TEL:** 056-3582

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VEHICLE DIAGRAM BOOK
NO. 210
FOR ELECTRIC MULTIPLE UNITS
(INCLUDING APT)
REVISION LETTER NO. 11

LOCATION

Diagrams EC 205, EE 306, EF210
211, 214, EH 222,
223 and 307.

In alpha/numerical order.

Diagrams ED 215
EH 262 and 274

ACTION

Replace with latest issue of these pages.

Insert new Diagrams EC 208, EE231,
232 and EH 233.

Remove and destroy these Diagrams.

REASON FOR CHANGE

Diagrams up-dated.

First issue.

No longer required.

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## VEHICLE DIAGRAM BOOK

**NO. 210**

**FOR ELECTRIC MULTIPLE UNITS**  
*INCLUDING APT*

**REVISION LETTER NO. 10**

<table>
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<th>LOCATION</th>
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<tr>
<td>Diagrams EA 260, EB 269, 270, ED 215, EE 266, 361, 362, and EH 271</td>
<td>Replace with latest issue of these pages</td>
<td>Diagrams up-dated</td>
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<tr>
<td>In numerical order</td>
<td>Insert new Diagrams EC 205, 206, EE 224, 225, 226, EH 224, 225, 226, and 308</td>
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NO. 210

FOR ELECTRIC MULTIPLE UNITS

(INCLUDING A.P.T.)

REVISION LETTER NO. 9

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<th>LOCATION</th>
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<td>271, 272, 277, 279,</td>
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<td>280, EE262, 263,</td>
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<tr>
<td>264, 265, 363, 365,</td>
<td>issue of these Diagrams</td>
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<td>367, EH160, 267,</td>
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<td>268, 275, 284,</td>
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<td>EJ160, 260, 360</td>
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<td>and 361</td>
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REVISION LETTER NO. 8

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<tr>
<td>Diagrams EB 266, EC 202, ED 204, 207, EE 216, 217 and EH 307</td>
<td>Replace with Issues 4 and 5 of these pages</td>
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<td>Insert new diagram EW 501</td>
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</tr>
<tr>
<td>Diagrams EA 203, EB 202, EE 207, and EH 202</td>
<td>Remove and destroy these diagrams</td>
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(INCLUDING APT)

REVISION LETTER NO. 7

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<td>Diagrams EC 201, EE 212, EE 261, EE 267, EH 272 and EO 201</td>
<td>Remove and destroy these diagrams</td>
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NO. 210

FOR ELECTRIC MULTIPLE UNITS

(INCLUDING APT)

REVISION LETTER NO. 6

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<td>EB 271, EB 272, )</td>
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<td>EB 278, ED 204, )</td>
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<tr>
<td>ED 205, ED 216, )</td>
<td>Replace with</td>
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<tr>
<td>EE 209, EF 205, )</td>
<td>Issues 2, 3, 4 and 5 of these</td>
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<td>EF 301, EH 279, )</td>
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<td>EH 281 and EH 302 )</td>
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In numerical order Insert new diagrams First issue
ED 217, EE 223,
EF 303, EF 304,
EH 285, EP 101,
EP 201 and EX 561

Diagrams EE 210, Remove and destroy No longer required
EF 206 and EF 302 these diagrams

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(INCLUDING APT)

REVISION LETTER NO. 5

LOCATION

Diagrams EA 264,
EB 269, EB 270,
EB 271, EE 361,
EE 362, EH 219,
EH 222, EH 282,
EH 284 and EJ 361

ACTION

Replace with Issues
2, 3 and 4 of these
pages

REASON FOR CHANGE

Diagrams up-dated

In numerical order

Insert new diagrams
ED 216, EE 219
to EE 222, EF 301,
EF 302 and EH 223

First issue

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REVISION LETTER NO 4

<table>
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<th>LOCATION</th>
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<td>EB 271, EB 272, EC 203, EE 243, 363, 364, EH 221, 281, 284, and EJ 361</td>
<td>Replace with Issues 2, 3 and 4 of these pages (except EH 284 which is a new issue)</td>
<td>Diagrams up-dated</td>
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NO 210

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REVISION LETTER NO 3

<table>
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<th>Location</th>
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<td>Preface page</td>
<td>Replace with new issue dated July 1982</td>
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<td>Diagrams EA201, 204, 206, 207, 261, 262, EB 278, 280, EC201, 202, 203, 204, ED204, 207, EE216, 217, 218, EH205, 210, 211, 216 to 219, 221, 307, EI201, 202, 203 and EJ 361</td>
<td>Replace with Issues 2, 3 and 4 of these pages (except Diagrams EC203, EE218 and BH221 which are new issue)</td>
<td>Diagrams up-dated</td>
</tr>
<tr>
<td>Diagrams EA203, EJ201 and EE211</td>
<td>Remove and destroy these diagrams</td>
<td>No longer required</td>
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